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Engels@200: Friedrich Engels and Digital Capitalism. How Relevant Are Engels's Works 200 Years After His Birth?

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Abstract: This paper takes Friedrich Engels 200th birthday on 28 November 2020 as occasion to ask: How relevant are Friedrich Engels's works in the age of digital capitalism? It shows that Engels class-struggle oriented theory can and should inform 21st century social science and digital social research. Based on a reading of Engels's works, the article discusses how to think of scientific socialism as critical social science today, presents a critique of computational social science as digital positivism, engages with foundations of digital labour analysis, the analysis of the international division of digital labour, updates Engels's *Condition of the Working Class in England* in the age of digital capitalism, analyses the role of trade unions and digital class struggles in digital age, analyses the social murder of workers in the COVID-19 crisis, engages with platform co-operatives, digital commons projects and public service Internet platforms are concrete digital utopias that point beyond digital capital(ism). Engels's analysis is updated for critically analysing the digital conditions of the working class today, including the digital labour of hardware assemblers at Foxconn and Pegatron, the digital labour aristocracy of software engineers at Google, online freelance workers, platform workers at capitalist platform corporations such as Uber, Deliveroo, Fiverr, Upwork, or Freelancer, and the digital labour of Facebook users. Engels's 200th birthday reminds us of the class character of digital capitalism and that we need critical digital social science as a new form of scientific socialism.

Keywords: Friedrich Engels, 200th birthday, anniversary, digital capitalism, digital capital, digital labour, digital commons, The *Condition of the Working Class in England*, critical digital research, critical digital social science, scientific socialism, international division of digital labour, digital commodity, computational social science, digital positivism, social murder, COVID-19 crisis, coronavirus, pandemic, Foxconn, Pegatron, Google, software engineering, digital labour aristocracy, online freelancers, Uber, Deliveroo, Fiverr, Upwork, Freelancer, Facebook, class struggles, working class, public service Internet platforms, platform co-operatives, *Outlines of a Critique of Political Economy*; *The Origin of the Family, Private Property and the State*; *Anti-Dühring*, *Socialism: Utopian and Scientific*, *Ludwig Feuerbach and the End of Classical German Philosophy*, *Dialectics of Nature*, Karl Marx

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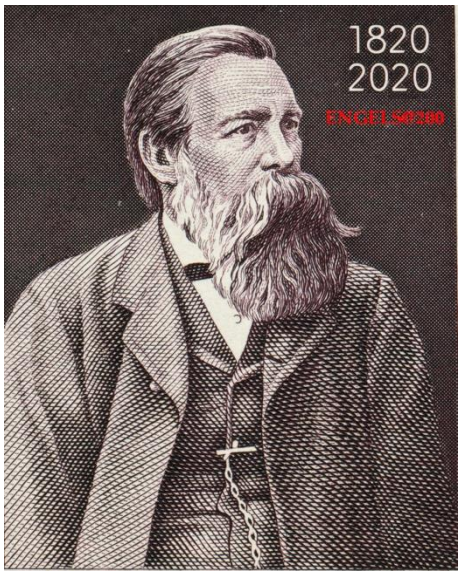

1. Introduction

28 November 2020: Friedrich Engels was born 200 years ago on 28 November 1820. Together with Karl Marx, Engels was the founder of the critique of the political economy. He was a theorist, historian, journalist, philosopher, politician and entrepreneur who used the money capital he accumulated for support Marx and the international socialist movement. In 2020, capitalism has changed, but is still around. Engels's 200th anniversary is a good occasion in order to ask: How relevant are Friedrich Engels's works in the age of digital capitalism? This essay deals with this question.

Engels together with Marx wrote the *Manifesto of the Communist Party*, *The German Ideology*, and *The Holy Family*. Engels also helped out Marx with writing newspaper articles that appeared under Marx's name. And he made a genuine contribution to critical theory with works such as *Anti-Schelling (Schelling and Revelation), Outlines of a Critique of Political Economy*, *The Condition of the Working Class in England, The Housing Question, Anti-Dühring*, *Socialism: Utopian and Scientific*, *Dialectics of Nature*; *The Origin of the Family*, *Private Property and the State*; *Ludwig Feuerbach and the End of Classical German Philosophy*. This article discusses the relevance of a variety of Engels's works for the critical analysis of digital capitalism with a special focus on *The Condition of the Working Class in England* because we are interested in the condition of the working class in digital capitalism today.

Section 2 discusses the role of history and class struggles in Engels's works. It deals with the question whether or not Engels was a vulgariser of Marx's theory, who advanced a deterministic concept of history. Section 3 outlines a critique of computational social science based on Engels's understanding of scientific socialism. Section 4 analyses the digital condition of the working class today. It uses Engels's works, especially his book *The Condition of the Working Class in England*, for analysing the digital labour of hardware assemblers, Google software engineers, platform workers, and Facebook users. The section also analyses the role of productivity gains achieved by digital automation and robotisation and labour inequalities in the COVID-19 crisis. Section 6 discusses working class struggles in digital capitalism. Section 6 draws conclusions.

2. Engels, History, Class Struggles

Positions on the intellectual relationship of Marx and Engels are split. There are on the

one hand those who argue that Engels misunderstood, manipulated and vulgarised Marx's theory and thereby not just turned Marx into Marxism but also laid the grounds for Stalinism (see e.g. Carver 1981; 1983; 1990; Levine 1975; 2006; Schmidt 1971). And there are those who say that Engels made his own contributions to socialist theory, but that there is no major theoretical difference between Marx and Engels (see e.g. Blackledge 2019; Fülberth 2018; Kopf 2017; Krätke 2020; Mayer 1935). The representatives of this position hold that Engels was a not just Marx's best friend, but also his closest intellectual companion so that there would be not Marx without Engels.

Terrell Carver and Norman Levine are two of the theorists who hold the first position Carver (1981, 93) writes that Marx and Engels had "different approaches to social science and perhaps politics itself". "Engels's influence has chiefly been on the theoretical side of Marxism, and his 'dialectics' and 'materialism' are notably memorialized in official Soviet philosophy" (Carver 1990, 257). Levine (2018, 195-196) argues that Engels neglected: "Engelsian Leninism was founded upon the belief that the meteoric advancement of science made socialism attainable and therefore led to the prioritization of the forces of production. […] Engelsian Leninism rested upon de-politicization" (Levine 2018, 195-196). Levine's arguments imply that there is a lack of focus on class struggle in Engels's works.

Stalinism eulogised elements from some of Engels's works. In his essay "Dialectical and Historical Materialism" published in the *History of the Communist Party of the Soviet Union Bolsheviks: Short Course* – the ideological bible of Stalinism –, Stalin (1945) references and quotes from Engels's *Anti-Dühring*, *Dialectics of Nature*, and *Feuerbach and the End of Classical German Philosophy*.

Stalin (1945) directly applies some aspects of the dialectics of nature to society and claims that this means that revolutions and the transition to socialism are inevitable:

> If the connection between the phenomena of nature and their interdependence are laws of the development of nature, it follows, too, that the connection and interdependence of the phenomena of social life are laws of the development of society, and not something accidental. Hence, social life, the history of society, ceases to be an agglomeration of 'accidents', for the history of society becomes a development of society according to regular laws, and the study of the history of society becomes a science (114).
>
> Further, if the passing of slow quantitative changes into rapid and abrupt qualitative changes is a law of development, then it is clear that revolutions made by oppressed classes are a quite natural and inevitable phenomenon (111).

For Stalin, socialism as science does not mean a science of society that is different from the natural sciences, but deterministic and mechanical social laws of nature operating in society. The implication is for Stalin that history develops in a linear manner, it is for him a "process of development from the lower to the higher" (Stalin 1939, 109). Stalin argues that the Soviet Union followed capitalism and therefore was a socialist system: "[T]he U.S.S.R. has already done away with capitalism and has set up a Socialist system" (Stalin 1945, 119). His implication was that anyone critical of him was bourgeois and anti-socialist. The mechanical interpretation of the dialectic legitimated Stalin's terror against his opponents.

The concepts of *Aufhebung* (sublation) and the negation of the negation are missing in Stalinist dialectics. They are however key features of Engels's dialectics. Stalin referred to Engels, but Engels's interpretation of dialectics was other than Stalin's not

based on mechanical and deterministic concepts. Engels is not be blamed for Stalinism.

In Engels's canonical works, there are some problematic formulations. For example, he writes that "the capitalist mode of production has likewise itself created the material conditions from which it must perish" (Engels 1878, 122) or that there is the "inevitable downfall" of the capitalistic mode of production (Engels 1880, 305). Such formulations create the impression that society is governed by mechanistic and deterministic laws.

But Engels (1878) stresses in the same works where the mentioned problematic formulations can be found that there is a difference between the negation of the negation in nature and in society. The dialectic has in each realm of the world "specific peculiarities" (Engels 1878, 131). The "history of the development of society turns out to be essentially different from that of nature" because humans "are all endowed with consciousness, are men acting with deliberation or passion, working towards definite goals" (Engels 1888, 387). Humans would act with intentions towards specific goals, but the outcomes would often be quite different from the intentions, which is an element of chance in society that is, however, "governed by inner, hidden laws" (Engels 1888, 387). He describes the proletarian revolution as the solution of capitalism's contradictions (Engels 1880, 325). "To accomplish this act of universal emancipation is the historical mission of the modern proletariat". A mission does not necessarily succeed. In these passages, Engels stresses that society operates on dialectical laws that are different from the laws of nature. The question is, however, what a law is in society. The more problematic formulations that can be found in these works can imply that capitalism automatically breaks down. But more frequently Engels stresses in the same works that history is the history of class struggles, for example: "In modern history at least it is, therefore, proved that all political struggles are class struggles, and all class struggles for emancipation, despite their necessarily political form – for every class struggle is a political struggle – turn ultimately on the question of *economic* emancipation" (Engels 1888, 387-388, 391). It is one of the laws of society that change happens through human practices and that in class society, class struggle is the decisive practice of transformation.

This assumption is also in line with Marx's and Engels's view of history in their early works. In *The Holy Family*, the first work that Marx and Engels co-authored, Engels writes: "*History* does *nothing,* it 'possesses *no* immense wealth', it 'wages *no* battles'. It is *man,* real, living man who does all that, who possesses and fights; 'history' is not, as it were, a person apart, using man as a means to achieve *its own* aims; history is *nothing but* the activity of man pursuing his aims" (Marx and Engels 1845, 93). In *The Manifesto of the Communist Party*, Marx and Engels (1848b, 482) say: "The history of all hitherto existing society is the history of class struggles". Marx added to the law of class struggle the law of the dialectic of structures and agency, of societal conditions and practices. Humans "make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past" (Marx 1852, 103). Society's transformation is based on dialectics of chance/necessity, freedom/determination, discontinuity/continuity, practices/structural conditions. In capitalism, the class contradiction and the contradiction between productive forces and relations of production with necessity call forth crises. The outcome of such crises is not determined and depends on the results of class struggles. Society's dialectic is a dialectic of objective contradictions and the human subjects' practices.

If Marx and Engels had assumed that capitalism would automatically break down and socialism would emerge inevitably, why would they have engaged in practical revolutionary activity? Engels participated, for example, active in the 1849 revolutionary uprising for democracy in Elberfeld and Baden. Marx and Engels were leaders of the League of the Just, the Communist League, and the First International. Engels's single deterministic historical formulations seem to have served the rhetorical-political purpose of motivating revolutionary optimism among activists.

In a letter to Borgius, Engels (1894) stresses that humans "make their history themselves, only in given surroundings which condition it and on the basis of actual relations already existing, among which the economic relations" form "the red thread which runs through them". The notion of the economic as read thread allows us to see the economic, i.e. social production, as the universal and common element of all social realms. Social production takes on different forms with emergent meanings but also is the red thread of society and its various spheres (see Fuchs 2020a).

Blackledge (2019, 240) stresses that by scientific socialism Engels did not understand "empiricism or positivism" and "a mechanical and fatalistic model of agency. "Engels was neither an empiricist nor a positivist. And as regards the charge of reductionism, he held to a stratified view of natural and social reality according to which emergent properties at each level could neither be reduced to laws governing the levels below them, nor could the laws through which they operated be understood in an empiricist or positivist fashion".

Engels stresses in *Socialism: Utopian and Scientific* in line with Marx's *Grundrisse* and *Capital* that science and technology are on the one hand "the most powerful weapon in the war of capital against the working-class" (Engels 1880, 314) and on the other hand important means of emancipation from capitalism and class society that support the establishment and reproduction of "the kingdom of freedom" beyond necessity (Engels 1880, 324).

Taken together, there is no doubt that there are some problematic formulations in Engels's canonical works. But a more pertinent reading is that he and Marx interpreted history as a dialectic of class struggles and structural conditions, which implies that there is no automatic breakdown of capitalism. The implication is also, as Tristam Hunt (2009, 361) stresses in his Engels-biography that Engels and Marx are not to blame for Stalin's terror:

> In no intelligible sense can Engels or Marx bear culpability for the crimes of historical actors carried out generations later, even if the policies were offered up in their honor. Just as Adam Smith is not to blame for the inequalities of the free market West, nor Martin Luther for the nature of modern Protestant evangelicalism, nor the Prophet Muhammad for the atrocities of Osama bin Laden, so the millions of souls dispatched by Stalinism (or by Mao's China, Pol Pot's Cambodia, and Mengistu's Ethiopia) did not go to their graves on account of two nineteenth-century London philosophers.

Although there are single problematic passages in Engels's works that imply that capitalism must automatically collapse, there are other passages that stress the difference of dialectical laws in nature and society and that a key social law found in class societies is that humans make their own history under given conditions and in class societies do so in the form of class and social struggles. Scientific socialism doesn't mean that society is governed by mechanical laws, but that socialist research studies society based on the combination of critical social theory and critical empirical social research.

3. Computational Social Science and Scientific Socialism

To speak of "scientific socialism" doesn't automatically and not necessarily apply a mechanistic and deterministic theory of society that assumes that capitalism automatically breaks down and society is determined by natural economic laws. The scientific understanding of socialism is not a natural science applied society but rather a social science of society (*Gesellschaftswissenschaft*) that stresses the key role of the conscious human being, social practices, social production, and social relations in society. Natural science theories are not necessarily deterministic and mechanistic. The point is that in the social sciences, the positivist tradition treated society based on natural science methods and mathematics, which focuses on pure quantification and assumes that everything can be calculated. The logic of positivism neglects society's qualities and the fact that not everything social and societal is calculable. We cannot properly calculate love, morals, sadness, happiness, (dis)respect, (in)justice, solidarity, etc. Society's social qualities can only be properly analysed by qualitative social research methods. Marx and Engels are not as such opposed to calculation and quantification, but they are critical of computing as means of domination and exploitation that drives capital accumulation and makes the qualities of society disappear behind things and numbers. This critique of quantification as aspect of capitalist accumulation has been reflected in Georg Lukács' (1971) notion of reification and Max Horkheimer's (1947) notion of instrumental reason.

In the contemporary social sciences, computational social sciences have emerged as a dominant paradigm that attracts lots of attention, support, funding and has increasingly been institutionalised.

David Lazer et al. (2009, 722) define computational social science as social science that "leverages the capacity to collect and analyze data with an unprecedented breadth and depth and scale" and operates with "terabytes of data". In the textbook *Introduction to Computational Social Science*, Cioffi-Revilla (2014, 2) defines computational social science: "The new field of *Computational Social Science* can be defined as the interdisciplinary investigation of the social universe on many scales, ranging from individual actors to the largest groupings, through the medium of computation. […] Computational social science is based on an information-processing paradigm of society" (Cioffi-Revilla 2014, 2).

The *Manifesto of Computational Social Science* (Conte et al. 2012) argues that computational social science operates with "massive ICT data" (327), conducts "massive data analysis" (330) that operates "up to the whole world population" (331). It is "a new field of science in which new type of data, largely made available by new ICT applications, can be used to produce large-scale computational models of social phenomena" (333). The *Manifesto* claims that computational social science constitutes "a new era" (327).

Computational social scientists set out to radically transform the social sciences. Computational social science is a new positivism. Its methods cannot understand the qualitative features of society such as motivations, norms, moral values, feelings, ideologies, experiences.

Cioffi-Revilla (2014, 1) explicitly situations computational social science in the context of Auguste Comte's "natural science of social systems, complete with statistical and mathematical foundations". Comte was the founder of positivism. Computational social science explicitly stands in the context of positivism. The *Manifesto of Computational Social Science* argues for turning sociology and the social sciences into a natural science: "sociology in particular and the social sciences in general would undergo

a dramatic paradigm shift, arising from the incorporation of the scientific method of physical sciences" (Conte et al. 2012, 341).

The danger is that computer science colonises the social sciences and leaves no space and time for critical theory, social theory, philosophy. The main danger of the computational social sciences is that it makes the social sciences uncritical and turns them into administrative sciences (see Fuchs 2017a). Engels warned in a different context of the dangers of positivism. He argues against a mathematical method that is "reducing qualitative differences to merely quantitative differences […] As Hegel has already shown *(Encyclopädie,* I, S. 199), this view, this 'one-sided mathematical view', according to which matter must be looked upon as having only quantitative determination, but, qualitatively, as identical originally, is 'no other standpoint than that' of the French materialism of the eighteenth century. It is even a retreat to Pythagoras who regarded quantitative determination as the essence of things" (Engels 1925, 534). For Engels (1925, 469), such reductive approaches are a form of "naïve materialism".

Engels criticises mechanical materialism that does not see and analyse the qualitative and dialectical aspects of the world. Engels in this passage refers to the first part of Hegel's *Encyclopaedia*, where Hegel discusses the dialectical logic. The reference is to the discussion of pure quantity as aspect of quantity. Hegel writes in this passage that "when we look closely at the exclusively mathematical standpoint that is here referred to (according to which quantity, which is a definite stage of the logical Idea, is identified with the Idea itself) we see that it is none other than the standpoint of *Materialism*" (Hegel 1830/1991, 159, addition to §99). He stresses that "freedom, law, ethical life […] cannot be measured and computed or expressed in a mathematical formula" (Hegel 1830/1991, 159, addition to §99) and that "we know very little about these things and the distinction between them, if we simply stick to a 'more or less' of this kind, and do not advance to some grasp of specific determinacy, which is here in the first place qualitative" (Hegel 1830/1991, 160, addition to §99).

Hegel and Engels remind us that computational social science cannot grasp society's dialectical relations that are not easily quantifiable. It cannot understand, model, calculate freedom, law, moral judgement, love, etc. Its analyses are one-dimensional. Critical social science should certainly adopt and experiment with data-driven methods, but not at the expense of the engagement with and application of critical theory (Fuchs 2017a). Digital data gathered on social media and other data-intensive environments can reveal important aspects of life in contemporary societies. What is needed are not simply new forms of prediction and quantification, but critical, creative and experimental methods that combine aspects of quantitative data with a qualitative understanding of humans' motivations, experiences, interpretations, norms and values (Fuchs 2017a). Whereas Marx and Engels were social scientists who wrote the *Communist Manifesto*, some contemporary social scientists write manifestos for a new positivism and many more believe in what such manifestos postulate, which results in the institutionalisation of computational social science and big funding for big data-based methods and project. Big data analytics and computational social science miss the difference between society and nature that Engels points out. The danger is that they reduce society to quantitative data and neglect its indeterminate, open, dialectical qualities.

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Computational social science is a paradigm in the social sciences that propagates mathematical models of society that use big data and predictive algorithms. Engels's scientific socialism is critical of positivism. Computational social science is a neo-positivism that neglects that qualitative features of society such as motivations, norms, moral values, feelings, ideologies, experiences, love, death, freedom, or (in)justice that cannot be reduced to mere quantities. Computational social science poses the danger of turning the social sciences into administrative, instrumental, positivist research that supports domination and exploitation and is a branch of computer science that has colonised the social sciences.

4. The Digital Condition of the Working Class Today

In this section, we will discuss the situation of the working class in digital capitalism. Engels's book *The Condition of the Working Class in England* plays an important role as starting point for such an analysis. The section introduces Engels's book (subsection 4.1), the relationship of technology and society (subsection 4.2), digital technology and relative surplus-value production (subsection 4.3), absolute surplus-value production at Foxconn (subsection 4.4), play labour at Google (subsection 4.5), precarious platform workers (subsection 4.6), labour in the COVID-19 crisis (subsection 4.7), and Facebook labour (subsection 4.8).

4.1. The Condition of the Working Class in England

The Condition of the Working Class in England (*CWCE*) is for many Engels' most influential book. Eric J. Hobsbawm writes that "the *Condition* is probably the earliest large work whose analysis is systematically based on the concept of the Industrial Revolution" (Hobsbawm 1969, 17). It "remains an indispensable work and a landmark in the fight for the emancipation of humanity" (Hobsbawm 1969, 17). David McLellan (1993, xix) writes that the *Condition* is "the first book to have dealt comprehensively with the industrial working class as a whole rather than just with particular groups or industries". Engels's method was a "[r]ich and complex" form of interdisciplinarity that combined "economics, philosophy, and labour history" (McLellan 1993, xix). Engels integrated a "rich mass of material" into "an extraordinary unity […] articulated […] under […] general principles" (Mayer 1935, 62)

Engels came from a bourgeois family. His father Friedrich Engels senior (1796-1860) owned the cotton factory Ermen & Engels that operated two cotton mills, one in Engelskirchen (Rhineland) and one in Manchester (United Kingdom).

Engels junior conducted the research for his book *The Condition of the Working Class in England* (*CWCE* = Engels 1845) during his stay in Manchester from 1842 until 1844, where he was supposed to learn his father's trade. Engels directly experienced the working class' conditions in England and got in touch with workers, from whom he learned about their everyday life and the problems they faced. Family status does not determine one's political worldview. Born into a capitalist family, Engels became one of the international leaders of the communist movement. There is no 1:1 relationship and no mechanic determination of culture by the economy. Engels junior became his father's representative in the Manchester business. After the death of his father in 1860, Engels became the co-owner of the Manchester establishment. He managed the company, funded Marx's life in London, financially and intellectually supported the socialist movement, and was active as a writer. In 1869, Engels had accumulated enough wealth in order to be able to sustain himself and Marx and family, and support the socialist movement. He sold his share in Ermen & Engels, retired from the company, and entirely devoted himself to the socialist movement and theory.

In *CWCE*, Engels analyses the rise, early development and consequences of capitalism in England. The decisive features he mentions are a) the working class, b) industrial technologies such as the steam-engine as moving technology and manufacturing machinery as working technology that replaced handicraft, c) the capitalist class, and d) the division of labour.

In *CWCE,* Engels analyses the terrible conditions that the working class had to endure in industrial England, including long working hours, low wages, poverty, overcrowded and dirty slums and dwellings, poisonous and uneatable food, overwork, starvation, death by hunger, lack of sleep, air pollution, untreated illnesses, egotism and moral indifference, crime, alcoholism, bad clothes, unemployment, rape, homelessness, lack of clean water, drainage and sanitation, illiteracy, child labour, military drill in factories, overseers' flogging and maltreatment of workers, deadly work accidents, fines, etc.

Engels characterises the misery the working class faces as "a condition unworthy of human beings" (*CWCE,* 43), conditions where humans cannot "think, feel, and live as human beings" (*CWCE*, 220), degradation to "the lowest stage of humanity" (*CWCE,* 73), treatment of workers "as mere material, a mere chattel" (*CWCE,* 66). Engels characterisation of capitalism as dehumanising resembles Marx's introduction of the notion of alienation in the *Economic and Philosophic Manuscripts of 1844*, where Marx (1844, 517) speaks of one aspect of alienation as "*alienation of the human being* from being *human*"[1]. Out of such words speaks the deep humanism of Engels and Marx. They both understand socialism is a humanist society that enables a good life for all humans.

Using factory inspectors' reports, parliamentary reports, observation, and the analysis of news reports, *The Condition of the Working Class in England* shows that Engels already in the 1840s practiced and pioneered empirical social research (Kurz 2020, 67; Krätke 2020, 29-34; Zimmermann 2020). In *Capital Volume 1*, Marx (1867) uses the same empirical method as Engels in CWCE, which shows that Engels's work had large influence on Marx. Marx (1867, 349 (footnote 15), 573, 755), explicitly refers positively to Engels's book several times. For example, Marx (1867, 349 [footnote 15]) writes:

[1] Übersetzung aus dem Deutschen [CF]: „die *Entfremdung des Menschen* von dem *Menschen*"

> How well Engels understood the spirit of the capitalist mode of production is shown by the Factory Reports, Reports on Mines, etc. which have appeared since 1845, and how wonderfully he painted the circumstances in detail is seen on the most superficial comparison of his work with the official reports of the Children's Employment Commission, published eighteen to twenty years later (1863-7).

Working on *Capital*, Marx re-read Engels's *Condition* and wrote to him about the book: "With what zest and passion, what boldness of vision and absence of all learned or scientific reservations, the subject is still attacked in these pages!" (Marx 1863, 469).

4.2. Technology and Society

Some observers, such as McLellan (1993, xviii) argue that underlying Engels approach in *CWCE* is "a technological determinism that was to remain with Engels all his life". There are indeed some formulations in CWCE that can create such an impression: The "industrial revolution […] altered the whole civil society" (*CWCE*, 15); the "proletariat was called into existence by the introduction of machinery" (*CWCE*, 29)

But Engels leaves no doubt that capitalist relations of production, i.e. private property relations, the class relation between capital and labour and the profit imperative, shape the development and application of machinery. He says that capitalism is the cause of misery: The "great central fact" is "that the cause of the miserable condition of the working class is to be sought […] in *the capitalistic system itself*" (*CWCE*, 314). When discussing machinery, Engels points out that the social conditions under which technology exist are the factors that have decisive influence on technology's impacts on society: "The consequences of improvement in machinery under our present social conditions are, for the working man, solely injurious, and often in the highest degree oppressive" (*CWCE*, 149).

In CWCE, Engels often describes class relations as competition and makes clear that not machines, but transformation of class relations created the proletariat. Competition – "the battle of all against all" – "created and extended the proletariat" (*CWCE*, 87). Capitalist competition means a class conflict between capital and labour but also competition between capitalists that results in the centralisation of capital and competition between workers, such as between the "power-loom weaver" and "the hand-loom weaver" (*CWCE*, 87).

Engels (Marx and Engels 1848b, 482) inserted a note to the 1888 edition of the *Manifesto*, saying that by "bourgeoisie is meant the class of modern Capitalists, owners of the means of social production and employers of wage-labour. By proletariat, the class of modern wage-labourers who, having no means of production of their own, are reduced to selling their labour-power in order to live". Capital means "the direct or indirect control of the means of subsistence and production" as "the weapon with which this social warfare is carried on" (*CWCE*, 37-38). The bourgeoisie is the class of property-holders (*CWCE*, 281). The bourgeoise measures "[a]ll the conditions of life […] by money" (*CWCE*, 282). The decisive aspect of technology in capitalism is that capitalists own technologies as private property that is a means of production used for accumulating capital and the production of surplus-value and commodities.

Also in *Outlines of a Critique of Political Economy*, a foundational text of Marx's and Engels's approach, young Engels (1843, 442-443) stresses that science and technology are instruments in the hands of the bourgeoisie:

> In the struggle of capital and land against labour, the first two elements enjoy yet another special advantage over labour – the assistance of science; for in present conditions science, too, is directed against labour. Almost all mechanical inventions, for instance, have been occasioned by the lack of labour-power; in particular Hargreaves', Crompton's and Arkwright's cotton-spinning machines. There has never been an intense demand for labour which did not result in an invention that increased labour productivity considerably, thus diverting demand away from human labour. The history of England from 1770 until now is a continuous demonstration of this. The last great invention in cotton-spinning, the self-acting mule, was occasioned solely by the demand for labour, and rising wages. It doubled machine-labour, and thereby cut down hand-labour by half; it threw half the workers out of employment, and thereby reduced the wages of the others by half; it crushed a plot of the workers against the factory owners, and destroyed the last vestige of strength with which labour had still held out in the unequal struggle against capital.

Marx (1859, 264) characterised the *Outlines* as "brilliant essay on the critique of economic categories" and directly referred to it several times in Capital Volume I (Marx 1867, 168 [footnote 30], 253 [footnote 5], 266-267 [footnote 20], 788 [footnote 15]). In the Outlines, Engels points out that "the mental element of invention, of thought" (Engels 1843, 427), as in the form of science, is part of human labour and the "human, subjective side, labour" (427) of production. In work, the human being is "active physically and mentally" (428). Engels here on the one hand points out the dialectic of mental and physical activity in work and on the other hand identified mental work, or what today is often called knowledge or information work, as important aspect of production.

The assumption that Engels was a technological determinist cannot be sustained. He analysed technology in capitalism as embedded into class relations so that there is capitalist ownership of technology as private-property that is utilised as means for the production of surplus-value, commodities, and profit.

4.3. Digital Technology and Relative Surplus-Value Production

In the *Grundrisse*, Marx (1857/58) introduced the notion of surplus-value, by which he means that workers produce unpaid labour during a portion of the working by that capitalists appropriate and turn into monetary profit. Marx (1867, 645) distinguishes two methods of surplus-value production: "The production of absolute surplus-value turns exclusively on the length of the working day, whereas the production of relative surplus-value completely revolutionizes the technical processes of labour and the groupings into which society is divided". Absolute surplus-value production means the lengthening of the unpaid part of the working day. Relative surplus-value production is the increase of productivity so that more value is produced during a certain time period than before. Engels anticipated both concepts in *CWCE.*

Engels gives many concrete examples of the increase of productivity through the introduction of new technologies. In the cotton industry, the invention of the jenny "made it possible to deliver more yarn than heretofore" (*CWCE*, 18). The introduction of the power-loom further increased the productivity of the English cotton industry: "In the years 1771-1775, there were annually imported into England rather less than 5,000,000 pounds of raw cotton; in the year 1841 there were imported 528,000,000 pounds, and the import for 1844 will reach at least 600,000,000 pounds" (*CWCE*, 21). Similar productivity increases could be observed in other industries, for example the manufacturing of wool: "In 1738 there were 75,000 pieces of woollen cloth produced

in the West Riding of Yorkshire; in 1817 there were 490,000 pieces, and so rapid was the extension of the industry that in 1854, 450,000 more pieces were produced than in 1825. In 1801, 101,000,000 pounds of wool (7,000,000 pounds of it imported) were worked up; in 1855, 180,000,000 pounds were worked up, of which 42,000,000 pounds were imported" (*CWCE*, 22-23).

Engels describes the phenomenon of relative surplus-value production, but did not have a theoretical concept naming this process. Marx later introduced based on Engels the concepts of surplus-value and the methods of surplus-value production.

Since the middle of the 20th century, The capitalist invention and the capitalist application of digital production technologies has led to significant increases of productivity. Just like Engels observed the impacts of technologies such as the steam-engine and the power-loom, we today can observe the effects of the digitalisation of production that has increased productivity.

	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2000-2010	2011-2019 (Canada: 2018)	Total (for available time period)	Average annual productivity growth (1970-2010)	Years it takes to double productivity (based on average annual productivity, 1970-2010)
Canada			27.8	26.5	33.0	6.0	14.9	108.2	2.3	43.5
France	47.0	68.5	42.5	38.7	43.5	29.4	9.1	269.6	3.9	25.6
Germany			28.3	16.4	32.4	19.5	9.5	106.0	2.4	41.7
Italy			52.6	32.8	26.4	-0.1	12.6	124.2	2.8	35.7
Japan			49.2	38.7	26.6	38.2		152.6	3.8	26.3
UK			22.5	45.6	30.5	31.9	1.4	132.0	3.3	30.3
USA			19.7	33.6	42.9	46.7		142.9	3.6	27.8
G7			30.1	32.7	34.6	33.9		131.3	3.3	30.3
OECD					20.1	34.6		54.8	2.4	41.7

Table 1: Total annual labour productivity growth in manufacturing in percentage, productivity is measured as labour productivity per unit labour input (in most cases gross value added in constant prices per hour worked), data source: OECD STAN

Table 1 shows productivity growth data for the G7-economies. It uses labour productivity growth as a measure of productivity. Labour productivity is a statistical measure of the gross value added (measured in constant US$) produced per hour worked in a particular industry. It calculates labour productivity by diving the total value added in an industry during one year by the total amount of working hours in that industry. The data in table 1 shows the ten-year growth rate of labour productivity. Not all data was available, so some fields have been left undefined. In advanced capitalist countries, labour productivity has more than doubled over a time period of forty years (1970-2010). In the analysed national economies, it takes on average between 26 and 44 years to double the productivity of manufacturing. This was also the time when computing was introduced in manufacturing as a production technology. Capitalist digitalisation has resulted in large productivity growth in manufacturing and other industries.

Industry 4.0 is about technologies that combine the Internet of Things, Big Data, social media, cloud computing, sensors, artificial intelligence and robotics in the production, distribution and use of physical goods. The bourgeoisie has declared the fourth industrial revolution to try to automate the production, distribution, handling, repair and disposal of industrial goods such as cars (Fuchs 2018c). It hopes to increase the profit rate of the manufacturing industry.

Engels pointed out that the capitalist shaping and use of industrial technologies turned workers into "machines pure and simple" (*CWCE*, 17). The capitalist shaping, development, design and use of digital technologies has contributed to forms of alienation such as the enslavement of mine workers who extract the physical resources out of which digital hardware is manufactured, long working hours in the assemblage of hardware and in the software and creative industry, an always-on-work-culture mediated by laptops, phones and tablets as means of production, precarious freelancing in the digital industries, etc.

4.4. Absolute Surplus-Value Production at Foxconn

Engels gives a picture of the terrible conditions that members of the working faced in England in the 1840s. One of his examples are the dress-makers in London:

> They employ a mass of young girls – there are said to be 15,000 of them in all – who sleep and eat on the premises, come usually from the country, and are therefore absolutely the slaves of their employers. During the fashionable season, which lasts some four months, working-hours, even in the best establishments, are fifteen, and, in very pressing cases, eighteen a day; but in most shops work goes on at these times without any set regulation, so that the girls never have more than six, often not more than three or four, sometimes, indeed, not more than two hours in the twenty-four, for rest and sleep, working nineteen to twenty-two hours, if not the whole night through, as frequently happens! The only limit set to their work is the absolute physical inability to hold the needle another minute (*CWCE*, 217).

Here's another example of long working hours that Engels describes:

> Other manufacturers were yet more barbarous, requiring many heads to work thirty to forty hours at a stretch, several times a week, letting them get a couple of hours of sleep only, because the night-shift was not complete, but calculated to replace a part of the operatives only. […] The consequences of these cruelties became evident quickly enough. The Commissioners mention a crowd of cripples who appeared before them, who clearly owed their distortion to the long working hours. This distortion usually consists of a curving of the spinal column and legs (*CWCE*, 161-162).

What Engels analyses here is the method of absolute surplus-value production. Capitalist have the interest to make workers produce commodities for as many hours per day and per week as possible for as little wage as possible. Long hours and small wages promise high profits.

Absolute surplus-value production is also an important method of surplus-value production in 21st-century digital capitalism. In the period from 1992 until 2019, the number of agricultural workers in China decreased from 350 million to 120 million, the number of manufacturing workers increased from 180 million to 200 million, and the number of service workers went from 120 million to 440 million[2]. Unlike economic development in Western capitalism, where the rise of the service and information industries was accompanied by the shrinking of agriculture and manufacturing, China's capitalism with Chinese characteristics (Harvey 2005, chapter 5) combines industrialisation and informatisation as simultaneous processes.

[2] Data source: ILO World Employment and Social Outlook, http://www.ilo.org/wesodata

Western transnational digital corporations such as Apple, Dell, HP, and AsusTek make use of Chinese large and comparatively cheap labour force in order to export capital so that digital hardware is assembled in China by workers contracted by suppliers such as Foxconn, Pegatron, Compal Electronics, or Wistron. The goal is to increase profits by minimising labour costs.

> Students & Scholars Against Corporate Misbehaviour (SACOM) (2011) reported that workers at the Chinese factories at Foxconn, where iPhones and other hardware is assembled, faced conditions such as military drill, forced and unpaid overtime, fines such as the non-payment of wages, crowded accommodations, low wages, compulsory internships, toxic workplaces, etc. In 2010/2011, nineteen young Foxconn workers aged between 17 and 28 attempted to commit suicide by jumping from Foxconn buildings. Most of them died. They could no longer stand the terrible working conditions.

China Labor Watch (2017, 1, 3) conducted research in order to find out how the working conditions look like in the factories of the Apple suppliers Compal, Foxconn, Green Point, and Pegatron:

> In all of the four factories, weekly working hours surpassed 60 hours and monthly overtime hours surpassed 90 hours, with most overtime amounting to of 136 hours over a month. […] Workers were required to sign an agreement to voluntarily do overtime, opt out of paying for social insurance and opt out of housing funds. These acts are blatant attempts to evade responsibilities and are clear violations against China's Labor Law. […] Workers at Pegatron and Green Point were continuously working overtime without compensation. […] Both excessive working hours and tremendous pressure are severe problems at Foxconn. Since 2010, there have been more than 10 suicides, indicative of the terrible working conditions and rigid management. In September 2016, [a] CLW [China Labour Watch] investigator launched another undercover investigation at Foxconn. […] Most workers there had accumulated 122 hours of overtime each month […], far exceeding the legal limit of 36 hours per month as per China's labor laws.

Just like the dress-makers whose labour Engels analysed in the 1840s, 21st-century digital hardware assemblage workers at Foxconn, Pegatron and other suppliers are a largely young and female workforce that is highly exploited. Capitalist hardware corporations try to make workers conduct a high number of weekly working hours for low pay and with unpaid overtime in order to minimise production costs so that these transnational corporations profits can be maximised. The Chinese manufacturing industry is part of a global capitalist system, in which transnational corporations outsource labour to Asia in order to accumulate capital by making use of the method of absolute surplus-value production. China's large working class, whose members often leave rural areas in order to find work in urban manufacturing centres, is transnational corporations' source of cheap and highly exploited labour.

4.5. Play Labour at Google

Engels describes a faction of the working class that was relatively privileged. These were workers whose "state of misery and insecurity in which they live now is as low as ever" (*CWCE,* 321). He terms these workers the labour aristocracy, "an aristocracy

among the working-class" (engineers, carpenters, joiners, bricklayers) that has "succeeded in enforcing for themselves a relatively comfortable position" (*CWCE,* 321). Lenin (1920, 194) uses the notion of the labour aristocracy for "workers-turned-bourgeois", "who are quite philistine in their mode of life, in the size of their earnings and in their entire outlook". "They are the real *agents of the bourgeoisie in the working-class* movement, the labour lieutenants of the capitalist class".

Software engineers are a digital labour aristocracy. They tend to earn very high wages, which gives them a privileged position. The demand for their labour-power is very high. Although many software engineers are relatively rich money-wise, they are socially poor. They often lack social relations friendships, outside of the office. They spend most of their time in offices such as the Googleplex, where they work long hours. Many software companies want to keep them in the office by providing facilities for sports, entertainment, relaxation, etc. The Googleplex more looks like a playground than an office. In the life of software engineers, labour and play converge. Google workers are playworkers, workers for whom labour feels like play.

Google workers in comparison to ICT manufacturers have much higher wages and privileges, which also means that they are more unlikely to resist, which is, as Engels describes, typical for the labour aristocracy: "they are very nice people indeed nowadays to deal with, for any sensible capitalist in particular and for the whole capitalist class in general" (*CWCE*, 321).

This passage from Friedrich Engels's book *The Condition of the Working Class in England in 1844* describes typical working conditions in the phase of the industrialization of capitalism: work in factories was mentally and physically highly exhausting, had negative health impacts, and was highly controlled by factory owners and security forces.

The manufacturing labour that Engels analysed in the 1840s was physically highly exhausting. Programming does not require engineers to burn lots of energy. Whereas manufacturing labour feels like toil, Google labour tends to feel like play.

Like at the time of Engels engineers, carpenters, joiners, bricklayers, in digital capitalism software engineers hold qualifications and produce goods that are in high demand and allow achieving relatively high wages and income. The poor workers who Engels portrays in *CWCE* as toiling in industries such as cotton and wool manufacturing, dress-making, etc. were compelled to work long hours by poverty wages and the "silent compulsion of economic relations" (Marx 1867, 899) of the labour-market that makes them starve if they don't sell their labour-power. Poverty-wages were used as a means of coercion, as a method of absolute surplus-value production. The contemporary digital labour aristocracy also faces the silent compulsion of having to sell their wages. But these wages are very high because they work in a highly productive industry that produces a key commodity – software – that plays an influential role in almost all parts of the 21st century society. Digitalisation transforms all aspects of society, which is why software is in high demand and allows achieving high profits and commodity prices. Those who possess the key skill of knowing how to code software can therefore in turn achieve high wages. Absolute surplus-value production takes on a new form in this industry: software engineers often sign all-inclusive contracts that fixes a certain wage-sum per month without extra-pay for overtime. In the USA, the Fair US Labor Standards Act (Section 13 [a] 17) enables software corporations such as Google not to pay overtime if there is an hourly wage of at least US$ 27.63. This law legally enacts absolute surplus-value production in the US software industry.

In addition, new management methods that try to blur the distinction between labour-time/spare-time and between workspace/private spaces are often used in software

corporations in order to keep the workers in the company for long hours, which makes them work overtime and to experience the long hours they spend in their employers' premises not as alienation, but as play and fun. The result is that they work longer hours that are unpaid. Absolute surplus-value production in key sectors of 21st century digital capitalism such as the software industry takes on the form of play labour. The first, second, and third edition of my book *Social Media: A Critical Introduction* contains a chapter about the critique of the political economy of Google (Fuchs 2014, chapter 6; Fuchs 2017b, chapter 6; Fuchs 2021, chapter 5). For this chapter, I analysed online forums, where Google workers report on their working conditions. I updated this analysis for each edition (2014, 2017, 2021). The working conditions at Google stayed constant during this time: Google employees enjoy the content of their job, the perks such as free food and working for a high-reputation brand, but complain about the lack of work-life balance. When asked about working conditions at Google, they typical Google software-engineer says that "work/life balance is nearly non-existent" and one must be prepared to "work all day and night long" (Fuchs 2021, chapter 5).

Google employees enjoy the idea of working in a high-reputation company, tend to find their work tasks interesting, like the perks such as free food, but tend to complain about the long working hours, a lot of overtime, and the lack of work–life balance. Lack of work-life balance at companies such as Google mays a playful work environment that turns spare-time into unpaid labour-time.

Luc Boltanski and Ève Chiapello (2005) speak in this context of the "new spirit of capitalism". The new spirit of capitalism is a management method and management ideology. It promises labour that is characterised by

> autonomy, spontaneity, rhizomorphous capacity, multitasking (in contrast to the narrow specialization of the old division of labour), conviviality, openness to others and novelty, availability, creativity, visionary intuition, sensitivity to differences, listening to lived experience and receptiveness to a whole range of experiences, being attracted to informality and the search for interpersonal contacts (Boltanski and Chiapello 2005, 97).

Such promises "are taken directly from the repertoire of May 1968" (Boltanski and Chiapello 2005, 97). The new spirit of capitalism is a work culture of creativity, play, and fun that capital uses as new, sophisticated method of absolute surplus-value production that blurs establish distinctions and demarcations of space and time in the economy. Inspired by Boltanski and Chiapello, Eran Fisher summarises these changes in the following way:

> It is therefore best understood in terms of the eradication of the distinctions between these components: between companies and the network, producers and consumers, producers and users, labor and fun, forces of production and the production process, and so forth. These established industrial demarcations (and more specifically, part and parcel of the Fordist phase of capitalism) are now overturned with the emergence of network production (Fisher 2010, 140).

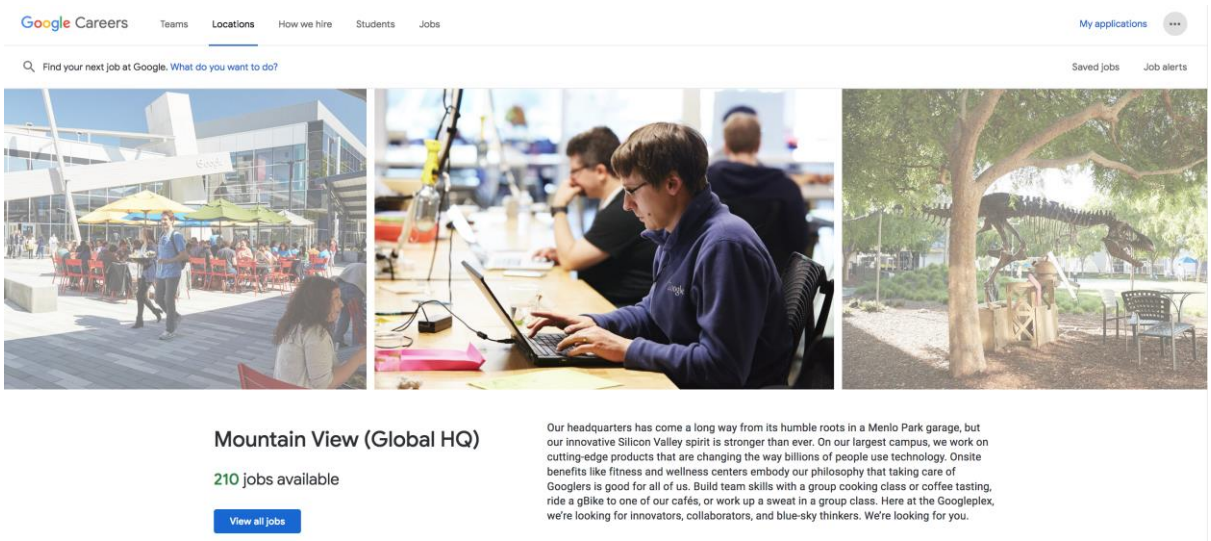

Figure 1: A Google ad for jobs at the Googleplex. Source: https://careers.google.com/locations/mountain-view/?hl=en, accessed 11 July 2020

Figure 1 shows a typical Google job-ad. It advertises a variety of jobs such as software engineer, designer, business strategist, marketing, sales support, policy and privacy manager, etc. in Googleplex, the company headquarter in Mountain View, California. Google in this ad lauds itself for proving worker "[o]nsite benefits like fitness and wellness centers", "a group cooking class", "coffee tasting", riding "a gBike to one of our cafés". The business philosophy is that "taking care of Googlers is good for us all". The point is that these benefits that promise fun, relaxation and entertainment are "onsite": They keep Googlers at the Google premises and turn leisure time into labour time. When workers attend yoga and fitness classes, cooking classes, cafés etc. at the workplace, then the reproduction of their labour-power takes place at the workplace so that there is no clear spatial and temporal demarcation of labour time and relaxation. The three images in the job ad symbolise the blurring of space and time at Google: coding, chatting with colleagues in a café, a and relaxation in a garden are presented as integral parts of work at Google. Googlers do not leave the workplace for leisure time, but stay at the Google workplace. They blurring boundaries between workspace and playground and between worktime and leisure-time result in an increase of unpaid labour-time. For Google workers, lifetime becomes Google time and value-creating labour-time. What Google means by saying that "taking care of Googlers is good for us all" is that providing a playful work environment is a method of exploitation by absolute surplus-value production that is good for Google's profits.

4.6. Precarious Platform Workers

Digital capitalism has also given rise to platform workers. These are workers who mostly are freelancers and use apps and Internet platforms for finding work. Examples are the Uber and DiDi taxi driver, the Deliveroo biker who delivers food, and the online freelancer who uses platforms such as Fiverr, Upwork, or Freelancer for finding work. All of these platforms have in common that they are large capitalist corporations that own a proprietary software programme that platform workers use in order to find customers. The platform is a key means of production that is privately owned by digital corporations. Without access to this platform, the freelancers cannot find customers. They depend on this means of production. Formally speaking they are self-employed, but in reality they are workers who are exploited by digital platforms that control the

key means of production as private property and capital. For each service organised via the platform, the capitalist platform corporation typically charges a share of the service price. It makes profit by renting out its platform to freelancers who produce a service commodity that is sold to customers that are found via the platform's algorithms. Platform capitalists typically advertise their platforms as enabling flexible work that allows workers to earn lots of money. Figures 2 and 3 show two examples.

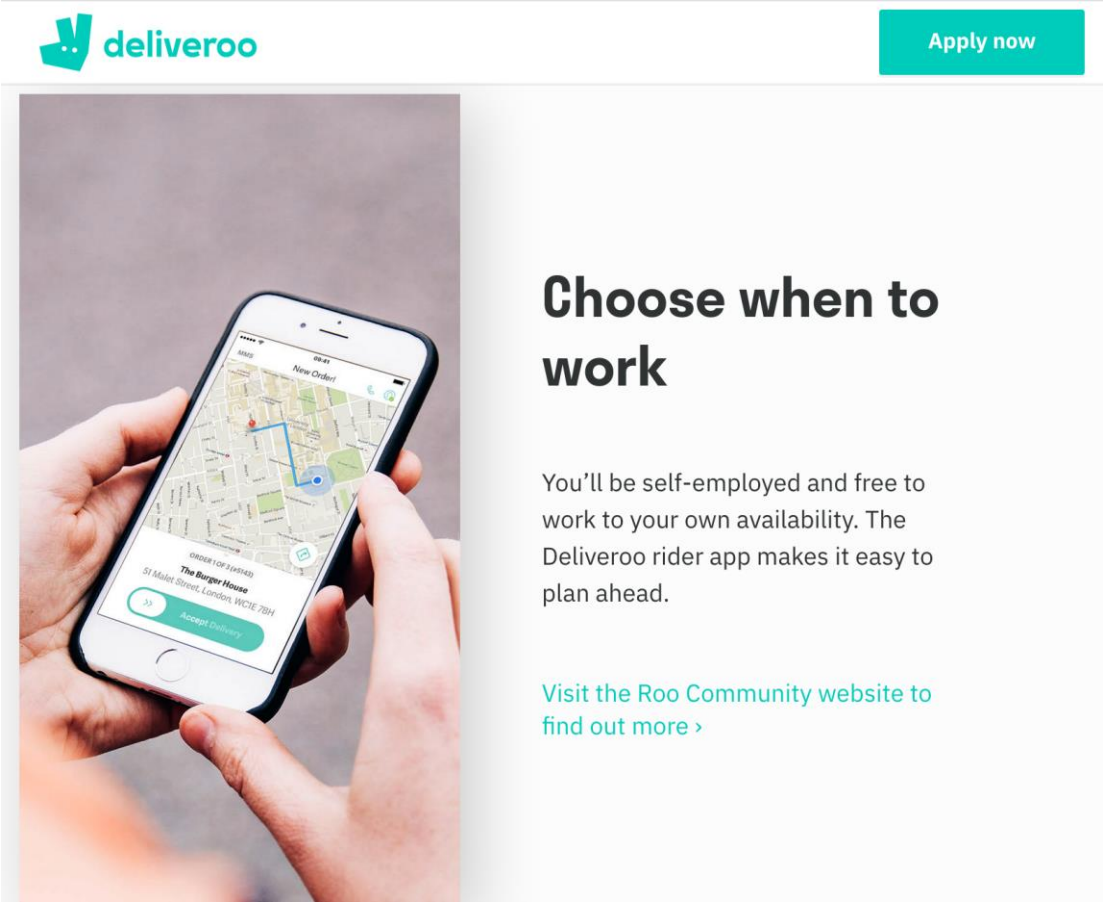

Figure 2: Deliveroo's self-presentation as platform that enables workers' freedom. Source: https://deliveroo.co.uk, accessed 11 July 2020

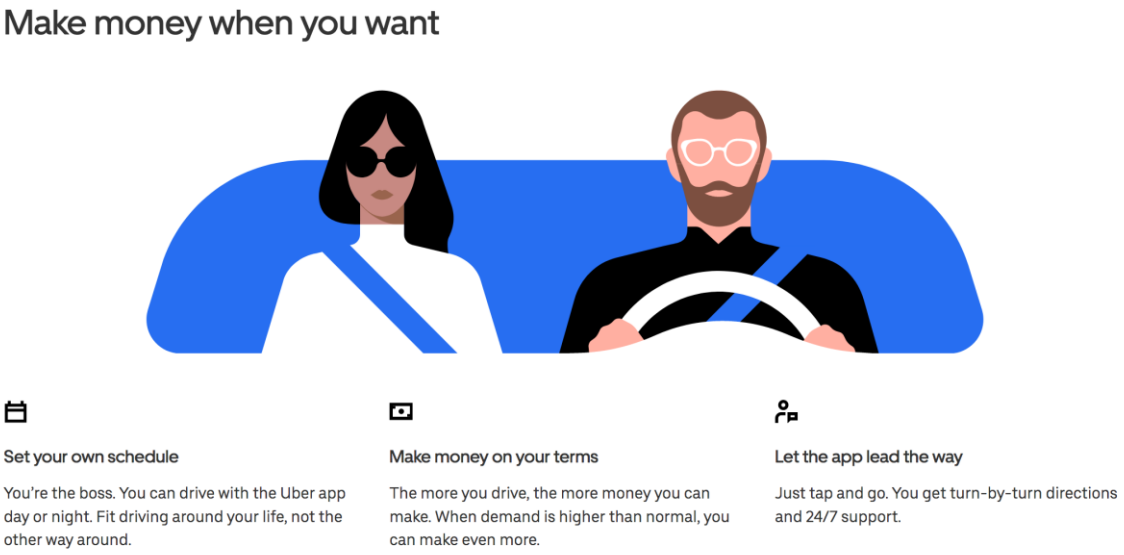

Figure 3: Uber's self-presentation as platform that enables workers' freedom. Source: https://www.uber.com/at/en/drive/, accessed 11 July 2020

The common narrative of these self-presentations is that freelancer platforms enable and support workers' freedom to be their own boss and determine their work times themselves, and in doing so earn lots of money. The reality is that platform workers are very often highly exploited, precarious workers who work long hours to survive (see Fuchs 2021, chapters 11 & 12; Fuchs 2017b, chapter 10).

Platform workers are often piece-workers. They are not paid by the hour, but for each completed service, each piece of work. Karl Marx (1867) dedicates chapter 21 in *Capital Volume 1* to piece-wages (see also Fuchs 2016, chapter 21). He characterises piece-work and piece-wages as the most fruitful source of reductions on wages, and of frauds committed by the capitalists" (Marx 1867, 694). Platform labour is a contemporary form of piece-labour and piece-wages in digital capitalism that aims at platform capitalists' reduction of investment costs for maximising profits. If platforms such as Uber had to pay its drivers per hour, it might make much less profit than it does when charging a percentage share of the piece-price. Platform capitalism is a dimension of digital capitalism that advances highly precarious labour.

In *CWCE*, Engels describes the working conditions of needlewomen, who were paid per piece. They were low-paid and conducted highly tiresome labour. "With the same cruelty, though somewhat more indirectly, the rest of the needle-women of London are exploited. The girls employed in stay-making have a hard, wearing occupation, trying to the eyes. And what wages do they get? I do not know; but this I know, that the middleman who has to give security for the material delivered, and who distributes the work among the needle-women, receives 1½d. per piece" (*CWCE*, 218). In digital capitalist society, transnational digital corporations such as Uber, Deliveroo, Fiverr, or Upwork are the contemporary middlemen that exploit digital pieceworkers.

4.7. Labour in the COVID-19 Crisis

The 2020 COVID-19 crisis has resulted in radical changes of society and the economy. In many countries, societies were "shut down" in order to lower the infection risk. Many people stayed at home and worked from home. The economy and society thereby

underwent substantial changes (Fuchs 2020b). Working at a physical distance mediated by Internet-based communication and co-operation technologies became widespread. Many knowledge and service workers, who normally conduct their work face-to-face in offices, started working at a distance from home. Workers such as academics, teachers, general practitioners, engineers, lawyers, consultants, artists, etc. became digital workers, who conduct services at a distance from their homes. Their homes became a supra-locale where working life, private life, education, leisure, etc. converged (Fuchs 2020b).

In the coronavirus crisis, being a digital worker who can work from home is a privilege that reduces the risk of unemployment, illness, and death. Other workers, especially those in the tourism industry, personal services, the hospitality industry, and the culture and entertainment industry, who cannot conduct their services from a distance, lost their jobs. Key sector workers such as food workers, supermarket workers, or health care workers, who work in industries that are absolutely essential for society, couldn't work from a distance and a shutdown of these realms of work was impossible. Because of a lack of personal protective equipment, workers in key sectors faced a much higher risk to get infected by and die from COVID-19.

Amazon's online shopping business boomed during the coronavirus-crisis. In the first financial quarter of 2020, its revenues increased from 59.7 billion US$ from the same period in 2019 to 75.5 billion, which is an increase by 26.5 percent[3]. Amazon's stock price increased from US$ 1,900 US-dollar at the start of 2020 to US$ 3,200 in the middle of July 2020[4]. Amazon is the world's 22nd largest transnational corporation with annual profits of US$ 10.6 billion in 2019[5]. In 2020. Amazon founder and CEO Jeff Bezos was with a total wealth of US$ 113 the world's richest person[6]. Amazon workers are precarious service workers who according to reports faced the risk of getting infected by COVID-19:

> In order to meet the demands of a country in which homes must suddenly be retrofitted to accommodate classrooms, co-working spaces, gyms, hair salons and so on, Amazon announced last month that it would hire 100,000 additional workers in its fulfillment centers and delivery networks, jobs for which many people will be desperate, given the decimated state of the retail and service industries. […] Though the company has increased pay by $2 an hour, employees around the country at Amazon warehouses and its subsidiary, Whole Foods, have been staging walkouts to demand better health protections during the pandemic. For years, Amazon has resisted the efforts of organized labor. […] In a letter to Mr. Bezos, […] labor leaders also addressed concerns that conditions at Amazon warehouses were unsafe: workers there were 'reporting crowded spaces, a required rate of work that does not allow for proper sanitizing of work spaces, and empty containers meant to hold sanitizing wipes'. […[various colleagues coming to work […] [were] unwell: fatigued, lightheaded, nauseous […] Later in the month, one of his colleagues, Barbara Chandler, tested positive for the coronavirus. She was advised by those in human resources at the facility to keep the news on the 'down low',' she told me. Frustrated by what he perceived

[3] Amazon Inc., SEC filings, form 10-Q for the quarterly period ending 31 March 2020, https://ir.aboutamazon.com/sec-filings

[4] Data source: Yahoo! Finance, https://finance.yahoo.com/quote/AMZN

[5] Data source: Forbes 2000 list for the year 2020, https://www.forbes.com/global2000, accessed on 11 July 2020.

[6] Forbes World's Billionaires List for 2020, https://www.forbes.com/billionaires/

> as the company's lack of transparency, Mr. Smalls made it his mission to disseminate information about cases of Covid-19 at the warehouse (Bellafante 2020).

Amazon workers in countries such as the USA, France, and Italy protested against these conditions. Amazon has not released data on the number of its workers that got infected and the number of those that died. In the Amazon warehouse in Shakopee, Minnesota, 88 out of 1,000 employees got infected within 70 days (García-Hodges, Kent and Kaplan 2020).

Tönnies Holding is a German meat processing corporation that has more than 16,500 employees and. Its headquarters are in Rheda-Wiedenbrück, a town in the German state of North Rhine-Westphalia, where the company also operates a large meat processing plant. In 2018, the company achieved annual revenues of 6.65 billion Euros[7]. In 2020, the wealth of Clemens Tönnies and Robert Tönnies, who are the two major owners the Tönnies Holding, was US$ 1.8 billion each, which equally placed them as the world's 1196th richest persons in 2020[8]. In summer 2020, there were more than 1,500 COVID-19 cases among workers in the Tönnies factory in Rheda-Wiedenbrück, among them many low-paid migrant workers who are bogus self-employed and live in crowded accommodations.

The agglomeration of workers in crowded spaces played a role in the spread of COVID-19 among Tönnies-workers. A report in *Der Spiegel* describes the conditions that the predominantly Eastern European Tönnies-workers faced in Rheda-Wiedenbrück:

> They tend to be hired by subcontractors, they are poorly paid, quickly replaced and inadequately protected – even during the current coronavirus pandemic. […] Now, Clemens Tönnies – sometimes referred to as the Pork Chop Prince or the Meat Baron – has a problem. For years, he has ruthlessly pursued efficiency, but now, the entire country wants to know what goes on behind his factory gates. He has perfected the art of extracting all he can out of both his employees and the animals they process, transforming living creatures into an industrial product. His strategy was volume, volume, volume and he cut his costs to the bone, becoming the favorite supplier to Germany's discount grocery chains. The company enjoys a 30 percent share of the pork market in Germany. […] A Polish worker in Rheda-Wiedenbrück has a bit more to say, though he is fearful of speaking openly. He says he earns 1,600 euros for 190 hours of work per month. His shifts begin at 3 a.m. and end at 1 p.m., with a 30-minute break every three hours. 'We stand at the conveyor belt about 20 to 30 centimeters apart, right next to each other. Often, the speed of the belt is ratcheted up and the supervisor watches us closely'. […] Like the Romanians in the white-plastered house near Münster, many workers aren't actually Tönnies employees, instead working for subcontractors, and without them […] According to Tönnies Holding, 50 percent of its workers are actually employees of such a company (Becker et al. 2014, 10-11; 11, 14)

Romanian Tönnies workers described the housing conditions they faced:

[7] Data source: https://toennies.de/en/home/, accessed on 11 July 2020.

[8] Data source: Forbes World's Billionaires List for the year 2020, https://www.forbes.com/billionaires/, accessed on 11 July 2020.

> Romanian worker: “It was always very crowded; there were sometimes 10, 12, occasionally even 14 people in one apartment. The monthly rent was 200 euros each. The buildings belonged to the subcontractors. […] But it just isn't fair to cram so many people into one apartment!” (Deutsche Welle 2020a)
>
> Most workers interviewed, many of whom were very upset, have been either employed by the huge meat producer Tönnies or its subsidiaries. They have described extremely exhaustive work and aggressive language. The workers accused managers of not putting enough protective measures in place in the wake of the COVID-19 pandemic. Some have also said that the shared accommodation, in which they were forced to live, was cramped and inhumane” (Deutsche Welle 2020b).

In *CWCE*, Engels introduces the notion of social murder, by which he means poor working conditions that endanger the lives of workers. Social murder means that workers die “indirectly, far more than directly” (*CWCE*, 38) through social structures that cause the death of workers and that “society places hundreds of proletarians in such a position that they inevitably meet a too early and an unnatural death, one which is quite as much a death by violence as that by the sword or bullet; when it deprives thousands of the necessaries of life, places them under conditions in which they *cannot* live ” (*CWCE*, 106). Capitalism places

> the workers under conditions in which they can neither retain health nor live long; that it undermines the vital force of these workers gradually, little by little, and so hurries them to the grave before their time. I have further to prove that society knows how injurious such conditions are to the health and the life of the workers, and yet does nothing to improve these conditions. That it *knows* the consequences of its deeds; that its act is, therefore, not mere manslaughter, but murder (*CWCE*, 107).

CWCE’s second chapter “The Great Towns” focuses on spatial conditions of working class life. It is an analysis of everyday urban life. Engels described how in English working class districts “many human beings here lived crowded into a small space” (*CWCE,* 39) where there is “little air – and *such* air!” to breathe (*CWCE,* 65). 175 years after Engels published CWCE in 1845, poor working conditions and the racist exploitation of migrant workers have in the COVID-19 crisis created new forms of social murder where workers cannot keep social distance and working conditions result in COVID-19 that makes it hard for infected poor workers to breathe and results in the death of a specific share of those who caught the virus.

The Tönnies-scandal shows that 170 years after Engels’s report on the conditions of the working class, poor and highly exploited workers still face threats to their health and life due to the agglomeration of many workers in cramped spaces. In the COVID-19 crisis, the poorest cannot afford social distancing and are forced to risk their lives. Capital draws profits from these risks because space is considered as a production factor of capital so that crowding workers into small work and living spaces increases profitability. Tönnies makes profits by low wages for long hours. And subcontractors in addition rob parts of the workers’ wages by charging high rents for overcrowded substandard accommodation. Renting out small places to extremely vulnerable workers allows rentiers to divide space into small compartments and to command a high rental price for these compartments. In addition, by keeping the compartments in a shabby

condition, the rentier tries to keep his investment costs low in order to be able to maximise their gains.

Amazon and Tönnies are examples of companies that have been criticised by observers in the context of COVID-19. These observers have argued that workers were put at risk of catching the virus by a lack of protective measures. Work inequalities have been reinforced on the COVID-19 crisis. Migrant workers and unskilled workers are more likely to have jobs that cannot be conducted over a distance. Slaughtering animals and packing books into parcels have not-yet been fully automated and robotised. They cannot be conducted at a distance via the Internet. Low-paid, low-skill workers who cannot work from a distance have faced an increased risk of catching COVID-19 and dying from the virus. In the COVID-19 crisis, social murder has taken on new forms.

4.8. Facebook Labour

In the book *The Origin of the Family, Private Property and the State*, Engels (1892, 131-132) gives a definition of materialism:

> According to the materialist conception, the determining factor in history is, in the last resort, the production and reproduction of immediate life. But this itself is again of a twofold character. On the one hand, the production of the means of subsistence, of food, clothing and shelter and the implements required for this; on the other, the production of human beings themselves, the propagation of the species.

Materialism in society is the insight that social production is the key factor of all societies and social realms. What Engels's passage allows us to understand is that social production as the foundation of society is not limited to the office and the factory, but extends into all realms of society, including the family. Engels's formulation has been influential on and led to discussions in Marxist and socialist feminism (e.g. Barrett 1980, 48-49, 131-132; Eisenstein 1979; Federici 2012, 1; Fraser and Jaeggi 2018, 32; Gimenez 1987; Haug 2015; Leacock 2008, 13-29; Notz 2020; Rowbotham 1973, 47; Sayers, Evans and Redclift 1987; Vogel 1996).

Although there is besides agreement lots of criticism of Engels's formulation, its importance lies in the stress that reproductive labour such as housework is a very important aspect of capitalism. It allows a focus on the economic dimension of the household where labour-power is reproduced. Rejecting interpretations that Engels separates gender oppression from class, Martha Gimenez (1987) argues that Engels's formulation should be interpreted dialectically. "Dialectically, that is the meaning of Engels's term, 'twofold'. To speak of the twofold nature of production is to refer, at the *metatheoretical level,* to its fundamental moments or aspects" (Gimenez 1987, 40). Gimenez argues that Engels stresses that class and gender oppression have different and united dynamics that are interacting, interconnected and entangled through (re)production and labour.

A key insight from Engels's *The Origin of the Family, Private Property and the State* for understanding digital labour is that labour extends beyond the factory and the office. The political economist of communication Dallas W. Smythe (1977) stresses that audience labour is labour that produces attention for advertisements. Consumers are audience workers who create the value of the advertisement (see Fuchs 2012). Targeted-advertising based Internet platforms such as Google and Facebook make profit based on the analysis of users' online behaviour, which results in the collection of big data,

which allows them to target ads (see Fuchs 2017; 2021). Users of Google and Facebook are unpaid digital workers, who produce Google and Facebook's value. They produce social relations, content, data, and meta-data that is appropriated by Google and Facebook and used for targeting and selling ads. Audience and user labour are like housework unpaid forms of productive, value-generating labour that operate beyond wage-labour. But housework and user labour are also quite different (for a discussion of commonalities and differences of wage-labour, slave-labour, housework, and user labour, see Fuchs 2018a). Housework produces and reproduces labour power. It is reproductive labour. Audience and user labour operate as part of entertainment as reproductive labour in the household. But audience and user labour also operate outside the home in a variety of social spaces via the use of mobile phones, laptops, tablets, etc. They facilitate the sale of commodities and the realisation of surplus-value, i.e. the generation of profit by commodity sale. Housework makes labour-power saleable on the labour commodity. User and audience labour contribute to the reproduction of labour-power via advertising-financed entertainment. These two forms of labour help selling goods on commodity markets by creating the value of ads.

Engels's *The Origin of the Family, Private Property and the State* has laid the foundation for the critical comprehension of the extension of the notion of productive labour beyond wage-labour and of the extension of the factory and the office into the household and onto the Internet.

4.9. Section Summary

Digital capitalism is based on an international division of digital labour, where a variety of workers is exploited under a variety of working conditions in different countries and working spaces so that transnational digital corporations accumulate capital. Engels in *CWCE* outlines concepts and analyses that can inspire digital labour analysis in the 21st century. He shows how capital uses technology as method of relative surplus-value production. In digital capitalism, digital technologies constitute a technological paradigm that advances new forms of automation and rationalisation of labour that have resulted in significant productivity increases so that more capital can be accumulated in less time. Engels also points out the inhumane consequences of absolute surplus-value production, i.e. the lengthening of the working day. In digital capitalism, absolute surplus-value production takes on the form of highly exploitative Taylorist work organisation in Chinese hardware assemblage factories owned by companies such as Foxconn or Pegatron, where workers toil long hours to produce the profits of transnational digital corporations such as Apple, Dell, or HP.

In digital capitalism, one also finds a form of absolute surplus-value production in software and other companies that employ highly skilled and highly paid engineers, who are incentivised to spend long hours and their life in office complexes such as the Googleplex where the boundaries between labour/play, working time/leisure time, office/home, workers/friends and family blur. The result is that the digital labour aristocracy works very long hours and has high wages but suffers from social poverty, i.e. a lack of work/life-balance, friendships and social life outside of the workplace. Digital platform workers are what Engels and Marx characterised as piece-wage workers. Engels's concept of social murder matters for understanding how in the COVID-19 crisis, the profit imperative combined with a lack of protective measures and social distancing in capitalist corporations put low-paid, low skilled workers at risk of infection and death. Engels's stress on reproductive labour in *The Origin of the Family, Private Property and the State* reminds us that in capitalism there are unremunerated unpaid forms of labour, such as housework and Facebook usage, that create commodities such as

labour-power and advertising space. In digital capitalism, we find digital houseworkers who are unpaid and highly exploited (see Jarrett 2016).

The international division of digital labour means transnational digital corporations' global outsourcing of labour in order to maximise profits. The question arises what potentials there are for working class struggles against exploitation in digital capitalism. The next section addresses this issue.

5. Working Class Struggles in Digital Capitalism

CWCE's chapter 8 "Labour Movements" analyses the role of working class struggles in capitalism. In this chapter, Engels identifies and analyses different types of working class struggles: a) crime, b) the destruction of machinery, c) trade unions, and d) political movements.

Engels stresses that there are different ways of how workers react to their exploitation. "To escape despair, there are but two ways open to him [the worker]; either inward and outward revolt against the bourgeoisie or drunkenness and general demoralization. And the English operatives are accustomed to take refuge in both", which resulted in "hundreds of uprising against machinery and the bourgeoisie" (*CWCE*, 149). At the time when Engels wrote *CWCE*, struggles of the working class were particularly focused on the introduction of the ten hours working day. Engels again and again refers to these struggles (*CWCE*, 179, 182-185, 242, 313). Such struggles resulted in the introduction of the Ten Hours Bill 1847 that limited the working day for women and teenagers to a maximum of ten hours.

Engels sees crime as purely individual reaction and the destruction of machinery as limited to one single dimension of capital's rule. He propagates the unity of economic class struggles and political class struggles. He argues for the "union of Socialism with Chartism, the reproduction of French Communism in an English manner". In digital capitalism, there is a large number of different cybercrimes, crime that is committed using digital technologies such as the Internet (see Wall 2007 for an overview discussion of cybercrime). Many Internet users every day receive spam and online scams via e-mails, which are the most widely spread forms of cybercrime. Such forms of cybercrime are not the reactions of a disenfranchised working class, but highly profitable capitalist businesses.

Machine breaking means the resistance against the introduction of machinery and "revolts against machinery" (*CWCE*, 222). In industrialising England, machine breaking was known as "Luddism", a movement named after its founder Ned Ludd. "This form of opposition also was isolated, restricted to certain localities, and directed against one feature only of our present social arrangements" (*CWCE*, 222). In the book T*he Making of the English Working Class,* the Marxist historian E. P. Thompson (1966) makes a more positive assessment of the Luddite movement than Engels (see also Fuchs 2016, 2000-2004). He writes that Luddism was not a blind attack on machinery as end-in-itself, but a well-organised movement that attacked the machines of capitalists that laid off workers (Thompson 1966, 564). Luddism was a working class struggle for "a democratic community, in which industrial growth should be regulated according to ethical priorities and the pursuit of profit be subordinated to human needs" (Thompson 1966, 552).

In digital capitalism, one can again and again hear suggestions and see initiatives that call for stopping to use digital technologies. An example is digital detoxing, the conscious choice to stop using digital technologies for certain periods of time. The problem of such strategies is that they often are technophobic and techno-deterministic. They see digital technologies as such as the cause of stress, health problems,

depression, loneliness, etc. They abstract from the capitalist, class and power relations that shape contemporary digital technologies. Digital detox retreats have turned into a new form of capital accumulation, where stressed digital workers pay for switching off their phones and laptops for a weekend or a week. For example, the three-day digital detox retreat at The Detox Barn in Suffolk (UK) costs £415 per person "for three nights (Friday – Monday) including all meals, two yoga sessions, smoothie demos, guided country walks and guided meditation"[9]. Deceleration, digital detox and digital Luddism are capital accumulation strategies. They advance the very cause of the stress and problems that digital workers suffer – capitalism.

Engels "was the first socialist to highlight the importance of trade unions to the struggle for socialism, and this fundamental insight was the concrete corollary of his historical humanism" (Blackledge 2019, 42). Trade unions aim at raising wages and "protecting the single working man against the tyranny and neglect of the bourgeoisie" (*CWCE*, 223). The strike is the union's main method of struggle by which they harm capitalists whose capital is "idle as long as the strike lasted, and his machinery would be rusting" (*CWCE*, 225). The capitalist antagonism between capital and labour is one about the control of the means of production and working time. The capitalist wants to make the workers conduct as much unpaid labour-time as possible, whereas the workers have the interest to control all of their labour-time themselves and not to be controlled by capitalists and managers. A strike disrupts labour-time. Workers stop to work. Necessary and surplus labour time are both zero. No value is created. No commodities are produced. Capitalists make no profit.

Engels writes about the emergence of a "New Unionism" (*CWCE*, 324), new trade unions of unskilled workers. These trade unions differed from the old unions of skilled workers focused on wage increases because unskilled workers often faced unemployment and no wages at all. In digital capitalism, we need digital trade unions that support digital workers in uniting in struggles against digital capital.

Digital socialism begins and develops through class struggles of digital workers. The working class has changed. There are a lot of digital workers in an international digital division of labour. Class struggles in the 21st century must look different than in the 19th and 20th centuries, as the forms and places of work have changed. Many freelancers work in the digital industry. They are not capitalists, but members of the working class. Most of them only own a computer as a means of production, no monetary capital. They do not hire other workers either. They work sporadically and precariously. And they are very difficult to reach and organize in trade unions. Co-working spaces provided free or cheaply by unions create spaces where digital workers come together and can be social spaces and starting points for union organising.

Traditional trade unions have problems with the representation and organisation of atypical workers such as freelancers. Some unions do not even intend to represent freelancers because they consider them to be capitalists. As the world of work has changed, trade unions and their strategies must change if they want to advance the interests of the working class. It is of particular importance that trade unions as well as left, socialist and communist parties and movements deal with precarious work, domestic work, unemployment, consumer work, public work, Facebook user work, digital work, digital surveillance, etc. and defend and represent these forms of work.

With the convergence of production and consumption, some consumer issues have become labour rights issues. Trade unions and left, socialist and communist parties

[9] https://queenofretreats.com/retreats/the-detox-barn-suffolk-uk/, accessed on 12 July 2020.

and movements should therefore consider digital consumer issues as labour rights issues and start to join forces with consumer protection associations.

The unions have lost influence and power, which means that the power of capital has been strengthened in class struggles. If the labour movement and trade unions do not succeed in engaging and organising on issues such as digital work, domestic work, unpaid work, freelance work, crowdsourcing, platform work, consumer work, work of internet users, privacy, digital surveillance, consumer protection, slave labour, etc., and if they do not see these issues as key to labour struggles, these movements commit suicide. To challenge the power of global capital requires the global networking of the working class and the internationalization of trade unions, left movements, socialist parties and trade union membership.

Class struggles are of course already taking place in digital capitalism. One example is strikes by Uber-riders. They are digital workers exploited by the Uber corporation, which controls the Uber app as a means of production. In a lawsuit in Britain it was confirmed that Uber-drivers have the legal status of workers.

Worker self-control means that the workers gain control over the app and its source code. For example, if the digital courier workers unionise with software engineers, an alternative app could be created. A strike by digital workers at Uber, Deliveroo, etc. would then consist of, for example, using the union app for one week instead of the capitalist app and damaging the capitalist companies during this period, for example to push through demands for a minimum wage of 15 Euros per hour for platform workers. Such a strike is a new form of class struggle in and against digital capital.

In digital capitalism, strikes need to add new digital dimensions of struggles in order to be effective. On the one hand, given that lots of news consumption and everyday communication takes place via social media, unions and labour movements should be present on social media and should mobilise and organise via social media and communicate their goals using hashtags, video platforms, social networking sites, messenger apps, blogs, memes, digital images, digital animations, etc. On the other hand, digital corporations such as Google, Facebook, and Amazon accumulate capital online, which is why digital strikes against such companies should make use of users-boycotts', which helps disrupting these corporations profit-making and allows putting pressure on them when making demands. An example of the digital strike is Adbuster's #OccupySiliconValley, a one-day digital strike against Facebook, Amazon, Apple, and Google that took place in September 2018. It called on users not to use these platforms for one day. Given that online usage of platforms such as Facebook and Google is not just consumption but also labour, a Facebook- and Google-boycott is also a labour strike. The digital workers put their eyeballs to rest or direct them elsewhere, which disrupts digital value creation. The campaign call read:

> Big Tech competes for one thing: our attention. They exploit our basic human instincts in the pursuit of unprecedented financial and cultural control. […] You can turn September 17th into DO NOTHING DAY [….] Partake in a one-day embargo against tech altogether. […] On September 17th, each one of us, in our own sweet way, will participate in a global takedown of Big Tech! […] Make the Internet ours again[10].

In respect to political struggles, Engels was a supporter of the Chartist movement, a political reform movement that struggled for suffrage and was associated with the English working class movement. Engels writes that the Chartists "wish to put a proletarian

[10] http://abillionpeople.org/occupy-silicon-valley/, accessed on 11 July 2020.

law in the place of the legal fabric of the bourgeoisie" (*CWCE*, 235). Chartism was for Engels a "class movement" that aimed at "Chartist democracy" (*CWCE*, 242). Already in this early work by Engels, it becomes evident that he did not understand communism as a totalitarian state but as a democratic socialist society. Consequently, Marx and Engels in the Manifesto of the Communist Party spoke of communism as "the struggle for democracy"[11] (Marx and Engels 1848a, 481).

The struggle for the reduction of the working day is the practical combination of economic and political struggles. In England, the 1847 Ten Hours Bill was the result of the combination of the socialist, the union and the Chartist movement. In the 1860s, the First International, in which Marx and Engels were key figures, formulated the demand of "eight hours work as the legal limit of the working day" (International Working Men's Association 1868, 5).

In 1919, the International Labour Organization passed the Hours of Work (Industry) Convention and in 1930 the Hours of Work (Commerce and Offices) Convention that defines the standard working week as not exceeding 48 hours per week and eight hours a day. In 2020, 52 countries had passed the first convention and 30 the second. Given there are 193 member states of the United Nations, it is evident that only a rather low number of countries has signed these international conventions. The prevalence of temporary work, zero hours contracts, part-time work, freelance labour, etc. shows that labour-time remains a key dimension of the class antagonism between capital and labour in the 21st century.

In 2020, the digital productive forces are developed to a high degree so that labour-time could be significantly reduced and everyone could work fewer hours but lead a better life. But digital technologies are embedded into what Marx and Engels termed the antagonism between the productive forces and the relations of production.

In the *Communist Manifesto*, they speak of the "revolt of modern productive forces against modern conditions of production" in capitalist society "that has conjured up such gigantic means of production and of exchange" and "is like the sorcerer, who is no longer able to control the powers of the nether world whom he has called up by his spells" (Marx and Engels 1848b, 489). In digital capitalism, the antagonism between the digital productive forces and capitalist relations of production takes on the form of an antagonism between digital capital and the digital commons. On the one hand, there are new forms of capital accumulation in the digital industries that combine a variety of digital commodities and digital labour. On the other hand, there are new forms of the digital commons – such as not-for-profit online platforms, non-commercial news media, Wikipedia, the free and open source software, non-commercial Creative Commons, platform co-operatives, the free software movement, radical open access, etc. – that go beyond digital capital and practically question capital accumulation. The antagonism between the digital machines and class relations has advanced the radical asymmetrical distribution of labour-time. Whereas some workers are highly stressed, have no leisure time and work very long hours, others are unemployed, underemployed, or precarious workers. The productive forces enable a substantial reduction of the standard working day that allows a more symmetrical distribution of labour time and a good life for all. Establishing a reduction of the working week without wage cuts requires class struggles for radical reforms of labour legislation. Just like the labour movement struggled for first for the ten-hours- and then for the eight-hours-working day, in digital capitalism we need struggles for the five-hours-working day and a four-day-working

[11] Translation from German: „die Erkämpfung der Demokratie"

week with full wage compensation. Such struggles point towards a post-scarcity society, in which digital technologies are used to minimise necessary labour time and maximise free time and the good life for all.

Writing in 1845, Engels says that a "mass of Acts for enclosing and cultivating commons is passed at every session of Parliament" (*CWCE*, 287). Communism "does away with all class antagonisms" (*CWCE*, 301). In the early phase of capitalism, common land was enclosed and peasants were forced into wage-labour. Marx (1867) terms this phase primitive accumulation. But primitive accumulation never ended. It continues in the form of imperialism, attempts of capital to make use of violence and other means for turning non-commodified spheres of society and nature into realms of capital accumulation. That is why digital capital seeks to colonise non-capitalist spaces such as the digital commons and turn them into spheres of digital capital accumulation. Engels pointed out that non-capitalist alternatives are possible and needed. For example, in the realm of media and education he argues that radical media and education are important intellectual means of struggle. He saw the Chartist newspaper *Northern Star* as "The only sheet which reports all the movements of the proletariat" (*CWCE,* 232). He stressed the importance of educational institutions such as the Chartist institutions where "the children receive a purely proletarian education, free from all the influences of the bourgeoisie" and one finds "reading-rooms" with "proletarian journals and books" (*CWCE*, 245).

We need concrete utopias of digital socialism. I see two potentials: On the one hand, the renewal of the movement of co-operatives and self-managed companies in the form of platform co-operatives, i.e. Internet platforms that are self-managed by users and digital workers. On the other hand, the creation of public Internet platforms through a network of public media.

Examples of platform co-operatives are the music platform Resonate, Fairbnb (an alternative to Airbnb), Taxiapp (an alternative to Uber), the photo platform Stocksy and the cooperation platform Loomio (Fuchs 2021, chapters 12, 14, & 15). Many platform co=operatives do not make it from concept to reality and many soon disappear again. Those that do exist usually remain small and insignificant, so they cannot challenge the digital capital. The Marxist social scientist Marisol Sandoval (2019) analyses how some of the platform co-operatives use the capitalist language and logic of "shareholders", "profits", "investments", "creators", "entrepreneurs", "innovation", etc., thus displacing radical politics.

Socialism is neither an app nor a platform. It cannot be downloaded from the Internet or clicked on a mobile phone. It is not enough to organise platforms as co-operatives. In order to survive and create a better society, platform co-operatives must politicise themselves and act as part of radical social movements that fight collectively and politically against capitalism and for socialism. Socialism is not an app and not a platform, but a political movement. Sandoval (2016a; 2016b; 2019) argues that platform co-operatives should play an important role in this movement and that we need class struggle co-operatives. By class-struggle co-operatives Sandoval means that co-operatives become parts of socialist movements fighting for redistribution, capital taxation and socialism. They are part of what Bhaskar Sunkara (2019) calls class-struggle social democracy, whereby social democracy is to be understood in the sense of Luxembourg as a democratic socialist movement and party.

In order to prevent a new fascism it is necessary to defend and renew democracy. Public media should play an important role in this. They are non-capitalist because they are not profit-oriented. And they can only act critically and as public media if they are not controlled by the state, i.e. they are not state media. The strengthening of non-

capitalist media is an aspect of the class struggle in so far as the power of the capitalist media is pushed back. But today we see that right-wing forces are attacking the public media and would like to abolish them. One strategy against this is the renewal of the public media in the Internet age.

There are initiatives like Public Open Space (https://public-open-space.eu) and discussions about the need for public media and international networks of public media as operators of public internet platforms. For example, a public YouTube, jointly operated by the BBC, ARD, ORF, etc., on which the archive material of the public media is offered with Creative Commons licenses for remixing for non-commercial purposes (Fuchs 2017c; 2018b; 2018d). Or a new edition of the legendary debate format Club 2 of the Austrian Broadcasting Corporation (ORF) in the form of an Internet-based Club 2.0, in order to counter the lack of debate culture that prevails in mediatised, digital capitalism. The principle of Club 2 was that it was a live discussion without censorship, without advertising and with open air time. Club 2 was a public sphere.

In today's highly accelerated capitalism there is hardly any time and space for complex arguments and debates. The acceleration logic of capital has also colonized culture, leading to the acceleration and boulevardisation of the public sphere. More and more experiences are squeezed into short time spans, leaving hardly any time for reflection and reflected discussion. The result is the boulevardisation of the media. Reality TV is one example of this. In my opinion, Hartmut Rosa (2013) correctly points out the alienated aspects of acceleration. It is crucial in this respect to see that acceleration under capitalism is driven by the logic of accumulation.

Club 2.0 is the digital public sphere in the age of user-generated content and social media (Fuchs 2017c; 2018b; 2018d). We need to strengthen and update the independence of public media from the state and capital and empower them to act as operators of digital platforms on the Internet and to use these platforms for further developing public service media's remits.

Concrete utopias of digital socialism need concrete initiatives and projects that should be part of broader movements and struggles for socialism and the rescue and strengthening of the commons and the public sphere.

In *CWCE*, Engels gave significant attention to working class struggles. One can draw important lessons from Engels's insights for the analysis of digital working class struggles. Engels stresses the importance of trade unions, strikes, and radical political reforms as aspects of class struggles. In digital capitalism, we need new forms, strategies and methods of trade unions and class struggle. 21st century society trade unions need to take serious housework, freelancers, the unemployed, platform labour and other forms of digital labour, the tendency of production and consumption to converge, digital surveillance, etc. In digital capitalism, many consumer rights issues are labour rights issues. In digital capitalism, strikes need to add new digital dimensions of struggles in order to be effective. There are two implications: First, class struggles and strikes should make use of digital platforms as means of organisation, mobilisation and communication. Second, strikes should also take place online and disrupt value production on digital platforms in order to exert digital power against digital capital. Engels stresses that questions of labour time are an important aspect of working class struggles. In 21st-century digital capitalism, the digital productive forces are so highly developed that the struggle for a five hour-working day and a four hour-working week is a realistic and necessary demand for improving the quality of life of the working class that today suffers from the precarity caused by the antagonism between the digital productive forces and the capitalist relations of production. Engels stressed the need

for alternatives to capital and capitalism. In digital society, platform co-operatives, digital commons projects and public service Internet platforms are concrete digital utopias that point beyond digital capital(ism). Such projects and demands to implement and support them should be part of struggles for a good life for all and 21st century socialism.

6. Conclusion

Engels' 200th anniversary is an excellent occasion for the analysis of life and the conditions of the working class in digital capitalism. This article contributed to this task by dealing with the question: How relevant are Friedrich Engels's works in the age of digital capitalism?

This paper showed that Friedrich Engels's works remain highly relevant in 21st century society and can inform the critical analysis of digital capitalism, technology and society, computational social science, digital positivism, digital labour, digital labour struggles, and the digital commons.

It is a mistake to assume that Engels is to blame for Stalinism and was the first vulgariser of Marx. But it is also an error to assume that his works are flawless. There are problematic, deterministic formulations in his works. But by and large he has stressed the importance of class struggles in and against capitalism and that the basic social law of society is that humans make their own history based on and shaped by given conditions. Engels did not formulate a theory of the automatic collapse of capitalism. Scientific socialism is not a natural science theory of society, but an anti-positivist dialectical social analysis the uses the dialectics of subject/object, agency/structures, practices/conditions, experience/reason, empirical research/social theory, chance/necessity, discontinuity/continuity, disorder/order, diversity/unity, individual/society, local/global, spontaneity/organisation, etc.

Let us summarise the main findings of this article:

- **Scientific socialism:**
  Scientific socialism doesn't mean that society is governed by mechanical laws, but that socialist research studies society based on the combination of critical social theory and critical empirical social research. For Engels just like for Marx, there is a difference between natural dialectics and societal dialectics. The basic law of society is that humans make their own history under given conditions. In class society, class and social struggles are the processes, by which humans make their own history.
- **The critique of computational social science as digital positivism:**
  In the contemporary social sciences, computational social sciences have emerged as a dominant paradigm that attracts lots of attention, support, and funding. Engels understood scientific socialism as a critique of positivism. Computational social science is a digital positivism that poses the danger of turning the social sciences into administrative, instrumental, positivist research that supports domination and exploitation. It neglects that qualitative features of society such as motivations, norms, moral values, feelings, ideologies, experiences, love, death, freedom, or (in)justice that cannot be reduced to quantities and computation.
- **The international division of digital labour:**
  Digital capitalism is based on an international division of digital labour, where a variety of workers is exploited under a variety of working conditions in different coun-

tries and working spaces so that transnational digital corporations accumulate capital. The international division of digital labour means transnational digital corporations' global outsourcing of labour in order to maximise profits. Engels in *The Condition of the Working Class in England* outlines concepts and analyses that can inspire digital labour analysis in the 21st century.

- **The antagonism between the digital productive forces and the capitalist relations of production:**
  Engels shows how capital uses technology as method of relative surplus-value production. In digital capitalism, digital technologies constitute a technological paradigm that advances new forms of automation and rationalisation of labour that have resulted in significant productivity increases so that more capital can be accumulated in less time. Digital capitalism is shaped by the antagonism between the digital productive forces and the capitalist relations of production. In 21st century digital capitalism, the digital productive forces are so highly developed that the struggle for a five hour-working day and a four hour-working week is a realistic and necessary demand for improving the quality of life of the working class that today suffers from the precarity caused by the antagonism between the digital productive forces and the capitalist relations of production. Engels stresses that questions of labour time are an important aspect of working class struggles.
- **The exploitation of digital labour:**
  Engels points out the inhumane consequences of absolute surplus-value production, i.e. the lengthening of the working day. In digital capitalism, absolute surplus-value production takes on the form of highly exploitative Taylorist work organisation in Chinese hardware assemblage factories owned by companies such as Foxconn or Pegatron, where workers toil long hours to produce the profits of transnational digital corporations such as Apple, Dell, or HP. In digital capitalism, one also finds a form of absolute surplus-value production in software and other companies that employ highly skilled and highly paid engineers, who are incentivised to spend long hours and their life in office complexes such as the Googleplex where the boundaries between labour/play, working time/leisure time, office/home, workers/friends and family blur. The result is that the digital labour aristocracy works very long hours and has high wages but suffers from social poverty, i.e. a lack of work/life-balance, friendships and social life outside of the workplace. Digital platform workers are what Engels and Marx characterised as piece-wage workers.
- **The social murder of workers in the COVID-19 crisis:**
  Engels's concept of social murder matters for understanding how in the COVID-19 crisis, the profit imperative combined with a lack of protective measures and social distancing in capitalist corporations put low-paid, low skilled workers at risk of infection and death. Engels's stress on reproductive labour in *The Origin of the Family, Private Property and the State* reminds us that in capitalism there are unremunerated unpaid forms of labour, such as housework and Facebook usage, that create commodities such as labour-power and advertising space. In digital capitalism, we find digital houseworkers who are unpaid and highly exploited.
- ***The Condition of the Working Class in England* (CWCE):**
  In *CWCE*, Engels gave significant attention to working class struggles. One can draw important lessons from Engels's insights for the analysis of digital working class struggles.

- **Trade unions in the digital age:**
  Engels stresses the importance of trade unions, strikes, and radical political reforms as aspects of class struggles. In digital capitalism, we need new forms, strategies and methods of trade unions and class struggle. 21st century society trade unions need to take serious housework, freelancers, the unemployed, platform labour and other forms of digital labour, the tendency of production and consumption to converge, digital surveillance, etc. In digital capitalism, many consumer rights issues are labour rights issues.
- **Digital working class struggles**:
  In digital capitalism, strikes need to add new digital dimensions of struggles in order to be effective. There are two implications: First, class struggles and strikes should make use of digital platforms as means of organisation, mobilisation and communication. Second, strikes should also take place online and disrupt value production on digital platforms in order to exert digital power against digital capital.
- **Alternatives to digital capitalism:**
  Engels stressed the need for alternatives to capital and capitalism. In digital society, platform co-operatives, digital commons projects and public service Internet platforms are concrete digital utopias that point beyond digital capital(ism). Such projects and demands to implement and support them should be part of struggles for a good life for all and 21st century socialism.

In *The Housing Question*, Engels (1872, 324-325) argues:

> And it is precisely this industrial revolution which has raised the productive power of human labour to such a high level that – for the first time in the history of mankind – the possibility exists, given a rational division of labour among all, of producing not only enough for the plentiful consumption of all members of society and for an abundant reserve fund, but also of leaving each individual sufficient leisure so that what is really worth preserving in historically inherited culture – science, art, forms of intercourse, etc. – may not only be preserved but converted from a monopoly of the ruling class into the common property of the whole of society, and may be further developed.

Computing has helped creating foundations for a highly productive post-scarcity socialist society, where wealth for all is possible and culture is the common property of the whole of society. Writing in the 19th century, Engels wrote of science, art (and more general forms of intercourse) as aspects of culture that in socialism benefit all. Today, he would also include digital technologies such as the Internet and would demand the creation of digital commons. If Engels were alive today, he would criticise all digital capital accumulation models and argue that digital technologies shouldn't be capital and commodities but common properties available without payment to the whole of society and benefiting everyone. Engels would certainly support the creation of a public service and commons-based Internet (see Fuchs 2021, chapters 14 & 15).

200 years after Friedrich Engels's birth, capitalism is alive, but Marx and Engels are not dead. They are ghosts that keep on haunting capitalism in the digital age in the form of class struggles and critical class analysis. Engels is a representative of a "dynamic, humanist, and creative" (Blackledge 2019, 242) critique of the political economy of capitalism. Engels's 200th birthday reminds us of the class character of digital capitalism and that we need critical digital social science as a new form of scientific socialism.

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