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Critical Perspectives on Digital Capitalism: Theories and Praxis

Special Issue, edited by Thomas Allmer, Sevda Can Arslan and Christian Fuchs

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Critical Perspectives on Digital Capitalism: Theories and Praxis. Introduction to the Special Issue

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Abstract: Digital capitalism matters. Digital capitalism shapes our lives. Digital capitalism needs to be better understood. We need critical theories of digital capitalism. We need to better understand praxes that challenge digital capitalism and aim at fostering digital democracy and digital socialism. tripleC's special issue on "Critical Perspectives on Digital Capitalism: Theories and Praxis" wants to contribute to establishing foundations of critical theories and the philosophy of praxis in the light of digital capitalism. This article introduces the topic and provides an overview of the special issue.

Keywords: digital capitalism, digital labour, class, domination, democracy, public sphere

1. Why the Analysis of Digital Capitalism Matters

Facebook and Google exploit our digital labour. That's digital capitalism. In late 2022 and early 2023, Google laid off 12,000 employees, Microsoft 10,000, Twitter more than 10,000, Amazon 18,000, and Facebook 11,000. That's digital capitalism. Algorithms are used by corporations for socially sorting and discriminating against customers who struggle to make ends meet and live in deprived neighbourhoods. That's digital capitalism. Lots of clickwork is conducted by poorly paid women in the Global South. That's digital capitalism. Digital fascism, fake news, post-truth culture and algorithmic politics circulate on capitalist and state-capitalist Internet platforms. That's digital capitalism. Information war and echo chambers polarise the digital public sphere, making a new World War between imperialist powers that compete at the global level for the control of territory, economic power and political as well as ideological hegemony and the nuclear annihilation of humankind and life on Earth more likely. That's digital capitalism.

Recently, digital workers assembling iPhones protested against the poor working conditions they faced at Foxconn in Zhengzhou during the COVID-19 pandemic. That's a praxis that challenges digital capitalism. In 2021, warehouse workers founded the Amazon Labor Union. That's a praxis that challenges digital capitalism. The non-profit federated Internet platform Mastodon has become a viable digital alternative in the light of users' discontent with Elon Musk's takeover of Twitter. That's a praxis that challenges digital capitalism. Internet experts and users have co-written the Public Service Media and Public Service Internet Manifesto that demands turning the Internet into a public good and advancing digital democracy. That's a praxis that challenges digital capitalism. While fascists spread post-truth on social media, the progressive news hour

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Democracy Now! has since 1996 utilised the non-commercial Internet, Public Service Media, as well as community radio and television stations for broadcasting a high-quality, independent news programme that reaches millions of viewers and questions fake news. That's a praxis that challenges digital capitalism.

Digital capitalism matters. Digital capitalism shapes our lives. Digital capitalism needs to be better understood. We need critical theories of digital capitalism. We need to better understand praxes that challenge digital capitalism and aim at fostering digital democracy and digital socialism. tripleC's special issue on "Critical Perspectives on Digital Capitalism: Theories and Praxis" wants to contribute to establishing foundations of critical theories and the philosophy of praxis in the light of digital capitalism.

2. The Analysis of Knowledge and Digital Media in the Critique of Political Economy

In Marxist theory and the Critique of Political Economy, there is a long history of the analysis of knowledge in capitalism that goes way back to Marx. We can here not cover and reflect on this history properly, but merely mention some examples.

In the *Grundrisse,* Marx argued that the "development of fixed capital indicates to what degree general social knowledge has become a *direct force of production*, and to what degree, hence, the conditions of the process of social life itself have come under the control of the general intellect and been transformed in accordance with it" (Marx 1857/1858/1993, 706). Marx anticipated the rising importance of knowledge in production as a consequence of the development of the productive forces. In his study of the *Grundrisse*, Roman Rosdolsky comments that Marx here foresaw "the development of machinery as an automatic system" and stresses that emancipation from exploitation requires "that the development of machinery" facilitates the "radical reduction of working time" as the foundation of "the abolition of class society" (Rosdolsky 1977, 243). Rosdolsky highlights that Marx analyses the antagonisms of technology in capitalism.

In debates on democratising socialism, Radovan Richta (1969/2018) at the time of the Prague Spring stressed that democratic socialism needed the use of computers as one of its material foundations. In this context, he coined the notion of the scientific and technological revolution. He argues that science and technology have become key productive forces, which reflects Marx's insights in the *Grundrisse* about the general intellect: "New productive forces, first and foremost *science* and its application in technology, are entering the production process on all fronts, and with them goes the base of all scientific activity – social integration and finally the growth of human capacities that underlies all creative activity. […] Science is now penetrating all phases of production and gradually assuming the role of the central productive force of human society and, indeed, the 'decisive factor' in the growth of the productive forces" (Richta 1969/2018, 26, 28).

On the one hand, Richta stresses that the scientific and technological revolution has been embedded into the dialectic of capitalism's continuity and discontinuity: "Some people believe that capitalism has undergone a complete regeneration, others are loath to admit any substantial modification. The reality is, however, more complicated. In its social and class basis, capitalism has not changed, but there has been a substantial change in the conditions under which the self-expansion of capital can and is taking place; this imposes a new relationship to the productive forces, and important innovations throughout the reproduction process" (Richta 1969/2018, 62). On the other hand, he points out computing's and the scientific and technological revolution's potentials to act as the material foundation of democratic socialism: "The new status of

science in society and the approaching shift of revolutionary strivings to new domains are coming to the fore: the economics of human resources assumes new significance, new conditions present themselves for shaping the socialist way of life and there is a growing need to solve the difficult problem of participation in civilization, to develop democratic forms of social life and so on" (Richta 1969/2018, 19).

Since the 1950s, there have been Marxist theory debates on computer-based automation in capitalism. Contributors have included, for example, Friedrich Pollock (1966), Harry Braverman (1974), Projektgruppe Automation und Qualifikation (1975, 1987), André Gorz (1982), David Noble (1984), and many others. Whereas some have expected that computer-based automation will bring about the end of work, which has been interpreted as either the rise of post-scarcity socialism or mass unemployment and de-qualification, others have argued that new jobs and skills are emerging. Similar debates are underway today in the context of AI-based automation (Butollo and Nuss 2022; Steinhoff 2021; Srnicek and Williams 2015).

Let us briefly mention one of the Marxist works on automation. André Gorz (1982) says that "post-industrial society" (81) has transformed capitalism and that computer-based automation has "eliminated most skills and possibilities for initiative" (28) and is "in the process of replacing what remains of the skilled labour force (whether blue or white collar) by a new type of unskilled worker" (28) so that a post-industrial neo-proletariat has emerged. He sees automation as antagonistic and, therefore, argues that it has brought about potentials for abolishing the proletariat and capitalism and establishing what he terms a "post-industrial socialism" (82) where "the time spent on heteronomous labour is to be reduced to a minimum" so that "the mass of socially necessary labour" is "distributed among the population as a whole in such a way that the average working day reduced to a few hours" (101) and there is the "abolition of work" along with "the development of autonomous activity" and the "liberation of time" (2).

Although again and again criticised for various reasons, it cannot be denied that the books by Michael Hardt and Antonio Negri have given an important impetus to Marxist theory, also concerning the analysis of computing and digitalisation. In *Empire*, Hardt and Negri (2000) argue that a "postmodern capitalism" (397) has emerged that is shaped by the dominance of what the two authors term "immaterial labour", a notion they base on Marx's concept of the general intellect (29): "The central role previously occupied by the labor power of mass factory workers in the production of surplus value is today increasingly filled by intellectual, immaterial, and communicative labor power" (29). Immaterial labour, according to Hardt and Negri, has three key features: "the communicative labor of industrial production that has newly become linked in informational networks, the interactive labor of symbolic analysis and problem solving, and the labor of the production and manipulation of affect" (30). In this age of immaterial labour, the proletariat is not limited to industrial labour but exists all over society, which includes many realms of non-wage-labour. "*In postmodernity the social wealth accumulated is increasingly immaterial; it involves social relations, communication systems, information, and affective networks. Correspondingly, social labor is increasingly more immaterial; it simultaneously produces and reproduces directly all aspects of social life. As the proletariat is becoming the universal figure of labor, the object of proletarian labor is becoming equally universal. Social labor produces life itself"* (258).

Building on Negri and other works in Autonomous Marxism, Nick Dyer-Witheford (1999) in his book *Cyber-Marx* argues that computing and the Internet are at the heart of what he terms "a post-Fordist, postmodern, informational capitalism" (7) that is highly antagonistic and has new potentials for "the common sharing of wealth" (2) and "an information-age communism" (13). In the Autonomous tradition, various authors

have spoken of the emergence of cognitive capitalism (Moulier-Boutang 2011; Vercellone 2007). Vercellone (2007, 16) understands cognitive capitalism as a stage of capitalist development where the "relation of capital to labour is marked by the hegemony of knowledges, by a diffuse intellectuality, and by the driving role of the production of knowledges by means of knowledges connected to the increasingly immaterial and cognitive character of labour". For Moulier-Boutang (2011, 56-57), cognitive capitalism is a "system of accumulation, in which the accumulation is based on knowledge and creativity, in other words on forms of immaterial investment. […] By cognitive capitalism we mean, then, a mode of accumulation in which the object of accumulation consists mainly of knowledge, which becomes the basic source of value, as well as the principal location of the process of valorisation".

This short discussion that could be further extended indicates that the *tripleC* special issue "Critical Perspectives on Digital Capitalism: Theories and Praxis" stands in a rich tradition of Marxist theory where a multitude of concepts focused on knowledge and capitalism such as the general intellect, the scientific and technological revolution, post-industrial capitalism, post-industrial socialism, immaterial labour, cognitive capitalism, etc. have been coined. One can, of course, spend lots of time engaging with and criticising each of these concepts. The important point is, however, that within Marxist theory, a theoretical and analytical strand has emerged that is focused on the roles that knowledge, communication, media, digital media, and digital communication play in and beyond capitalism. This special issue is a contribution to this type of Marxian analysis and theory construction.

3. The Notion of Digital Capitalism

Why do we as editors of this special issue suggest the use of the term "digital capitalism"? Aren't there other, better concepts? There is indeed a multitude of critical concepts that theorise and analyse the role of digital communication in capitalism. On the one hand, they include notions such as data capitalism, platform capitalism, high-tech capitalism, informatic capitalism, cybernetic capitalism, media capitalism, cyber-capitalism, or virtual capitalism. On the other hand, there are notions such as cognitive capitalism, knowledge capitalism, semio-capitalism, communicative capitalism, intellectual capitalism, or mental capitalism.

The first series of notions is focused on technological structures, i.e., objects. In contrast, the second series of notions is focused on ideas and culture, i.e., subjectivity. Primarily employing one of these terms therefore tends to solve the social theory problem of what roles structures and practices play in society in favour of either objects (structures, technologies) or subjectivity (ideas, practices). There is, however, a dialectic of structures and practices: Structures condition, enable, and constrain practices that result in the production and reproduction of social structures that again condition, enable, and constrain practices that again produce and reproduce structures, etc. *ad infinitum*.

The notion of "digital capitalism" is not automatically superior to any of the concepts just mentioned. They all have in common that they analyse the continuities and discontinuities of contemporary capitalism in a dialectical manner. In the public and academic debate, the notions of digital labour and digital capital have become relatively widely used in the past fifteen years. The notion of the "digital" in the context of critical analysis therefore has gained a dual, dialectical meaning. It is neither just focused on structures, technologies, and objects nor just focused on practices, humans, and subjects. In the context of capitalism, it rather has both a more subjective and a more objective connotation. Therefore, the notion of digital capitalism is suited to ground a

critical-dialectical analysis that allows us to understand the dialectics and antagonisms of digital objects and digital subjects, digital capital and digital labour, digital technologies and digital knowledge, etc. (Fuchs 2022).

Dialectical thought stresses the simultaneous identity and difference of phenomena, which creates tensions that drive development. One important tension in society is the one between the economic and the non-economic. We use the terms capitalism and digital capitalism not just with respect to the economy, i.e., (digital) production, (digital) distribution, and (digital) consumption. Rather, capitalism is a societal totality, a societal formation (*Gesellschaftsformation*) where the economic and the non-economic, exploitation and domination, class and identity, etc. stand in dialectical relations. Digital capitalism is the digital dimension of capitalism conceived as a societal formation (Fuchs 2022).

We use the following working definition of digital capitalism:

> "Digital capitalism is the dimension of capitalist society where processes of the accumulation of capital, decision-power, and reputation are mediated by and organised with the help of digital technologies and where economic, political, and cultural processes result in digital goods and digital structures. Digital labour, digital capital, the digital means of production, political online communication, digital aspects of protests and social struggles, ideology online, and influencer-dominated digital culture are some of the features of digital capitalism. In digital capitalism, the accumulation of capital and power is mediated by digital technologies. There are economic, political, and cultural-ideological dimensions of digital capitalism. Digital capitalism is an antagonistic dimension of society, a dimension that stands for how the economic class antagonism and the social relations of domination are shaped by and shape digitalisation" (Fuchs 2022, 312).

4. Overview of the Special Issue

The special issue gathers 14 articles and is divided into four sections: (1) Theorising Digital Capitalism; (2) Digital Labour and Class; (3) Domination in Digital Capitalism; and (4) Democracy, Public Sphere and Digital Capitalism.

4.1. Theorising Digital Capitalism

In the opening piece to the special issue, *Christian Fuchs* presents foundations of a critical theory of capitalism. He argues for defining capitalism not merely as economy and not as culture but as a formation of society (*Gesellschaftsformation*) and builds a concept of digital capitalism on such an understanding of capitalism. He engages with Nancy Fraser's concept of capitalism, some existing concepts of digital capitalism as well as related concepts, namely informational capitalism (Manuel Castells), surveillance capitalism (Shoshana Zuboff), and platform capitalism (Nick Srnicek). The paper also discusses the relationship of violence and digital capitalism, which is of particular importance in an age where a new world war has become more likely.

Jodi Dean argues that communicative capitalism is becoming neofeudal. The winner-takes-all principle of communication networks and platforms has brought forward a few tech billionaires (tech lords) who control the platforms and many precarious workers who depend on these platforms (proletarianised serfs). In an ecosystem where platforms only provide the digital infrastructure mediating interactions, "capital accumulation occurs less through commodity production and wage than through services, rents, licenses".

Friedrich Krotz theorises digitalisation with the help of Marxist scholars such as Alfred Sohn-Rethel and contextualises the computer in the mental and physical division of labour. He describes the computer as a machine that is different to humans and thereby contributes to the further development of critical humanism. The article concludes with possibilities of a different digitalisation that serves humanity and not capitalism.

Maïa Pal and Neal Harris introduce McKenzie Wark's concept of 'vectorialism' as an "entirely new mode of production" currently developing. The authors question Wark's focus on the mode of production methodologically drawing on arguments of E. P. Thompson and Political Marxists. Using the example of undersea cables, Pal and Harris show that "the contemporary use of infrastructure space remains consistent", concluding "that capitalism is unlikely to be displaced any time soon".

4.2. Digital Labour and Class

By focusing on high-skilled tech workers in the software industry, *Helene Thaa, Mirela Ivanova, Felix Nickel, Friedericke Hardering and Oliver Nachtwey* investigate the subjective interpretation of work in digital capitalism. While software workers hold strong claims towards their work and advance an ethos of the good technology, they simultaneously consider technology as a natural and autonomous force. Software workers thus capture a contradictory position between the critique and legitimation of digital capitalism.

Jasmin Schreyer presents and contrasts two case studies of German bike couriers. While the workers at the multinational food delivery corporation are confronted with mistrust and algorithmic management, the couriers of a local co-operative tend to describe their work as communicative, trustworthy and self-determined. By providing rich insights from qualitative interviews, the study walks a tightrope between platform capitalism and platform co-operativism.

Anthony Fung, Wei He and Feier Chen conduct an ethnographic study on "intern labour". They see this work of mostly undergraduate or postgraduate students as a new form of labour exploitation introduced by high-tech companies in China after their economy shrunk due to the pandemic. This "process by which the new generation is induced to accept a much more precarious economy […], yet is able to nevertheless survive" is coined "involution" in contrast to "revolution".

Petter Ericson, Roel Dobbe and Simon Lindgren analyse a set of academic publications of Critical AI Studies, a field that has been growing in recent times. The study shows that concepts such as class and capitalism only play a role in a distinct niche of the field, while the engagement with race and gender are more broadly presented. The authors argue for an integrative approach that brings together feminist, anti-racist and anti-capitalist struggles within critical AI research.

Max Haiven, Graeme Webb, Sarah Olutola and Xenia Benivolski – a team of scholars, creative writers and curators – provide a preliminary report about the "Worker as Futurist" project. The project subversively turns upside down the notions of dystopia and utopia in and beyond digital capitalism. Building upon worker's inquiry, rank-and-file Amazon workers were asked to write short science fiction stories about "the world after Amazon". The authors contextualise the project and reflect on what they have learned from the participants.

4.3. Domination in Digital Capitalism

Sébastien Shulz, Mathieu O'Neil, Sébastien Broca and Angela Daly research how the greening of digital commons works in theory and daily practices of three initiatives in

France. The authors found several constraints for the initiatives to "become a viable ecological alternative to digital capitalism" and suggest defeating those by using E.O. Wright's anticapitalist strategies framework.

Stefania Animento analyses how racism and digital capitalism are interrelated. Drawing on marketisation and racialisation approaches, the author researches the situation of Uber drivers in Berlin. Animento finds "that platforms organize the mobility of racism along their infrastructures", making racism "infrastructural".

Paul Obi researches digital capitalism in Africa focusing on Nigeria as the biggest economy of the continent. Using the example of Silicon Valley Big Techs, the author shows that prosumer capitalism can be understood as a new form of colonialism with a strong state-corporate interrelationship.

4.4. Democracy, Public Sphere and Digital Capitalism

Charli Muller engages with the writings of Rosa Luxemburg and her understanding of infrastructures (means of transportation and communication) and applies it to contemporary debates around the public ownership of the Internet. Just as Luxemburg considers infrastructural state investments mainly as an expansion of capitalist accumulation, Muller warns us that calls for the public ownership of the Internet are only progressive if they are situated in a broader anti-capitalist political programme.

In the closing piece to the special issue, *Elisabeth Korn and Jens Schröter* criticize Fuchs', Unterberger's and Habermas' calls on restructuring the public sphere as "implicitly based on the assumption that a technology that emerged in capitalism can be used for different, even contradictory, purposes". Instead, they argue, that the very notion of democracy has to be re-evaluated beyond representative democracy.[1]

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[1] A debate between Korn/Schröter and Fuchs about democracy, public service media and capitalism will be hosted in a future issue of the journal.

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1. Theorising Digital Capitalism

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Critical Theory Foundations of Digital Capitalism: A Critical Political Economy Perspective

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Abstract:
The overall task of this paper is to outline some foundations of a critical theory of digital capitalism. The approach of the Critique of Political Economy is taken as the starting point for theorising (digital) capitalism.
First, the paper discusses selected classical definitions of capitalism. Theories of digital capitalism must build on definitions and theories of capitalism. If capitalism is not only an economic order but a societal formation, the analysis of capitalism is the analysis of economic exploitation and non-economic domination phenomena and their interaction. Theories of digital capitalism should also address the question of how class, racism, and patriarchy are related in the context of digitalisation.
Second, the author introduces a notion of digital capitalism that is based on Marx's approach of the Critique of Political Economy.
Third, the paper engages with one influential contemporary approach to theorising capitalism, Nancy Fraser's Cannibal Capitalism. The author discusses what we can learn from Fraser's approach to theorising digital capitalism.
Fourth, the author discusses existing understandings of digital capitalism that can be found in the academic literature. These definitions are compared to the understanding advanced in this article.
Fifth, the paper discusses the relationship of the notion of digital capitalism from a Critical Political Economy perspective in comparison to the notions of the network society/informational capitalism (Manuel Castells), surveillance capitalism (Shoshana Zuboff), and platform capitalism (Nick Srnicek).
Sixth, the paper reflects on the relationship between digital capitalism and violence as we live in a (digital) age where a new World War is all but uncertain.
Finally, some conclusions are drawn.

Keywords: digital capitalism, critical theory, Critique of Political Economy

1. Introduction

Facebook and Google exploit our digital labour. That's digital capitalism. In late 2022 and early 2023, Google laid off 12,000 employees; Microsoft 10,000; Twitter more than 10,000; Amazon 18,000; and Facebook 11,000. That's digital capitalism. Algorithms are used by corporations for socially sorting and discriminating against customers who struggle to make ends meet and live in deprived neighbourhoods. That's digital capitalism. Lots of clickwork is conducted by poorly paid women in the Global South. That's digital capitalism. Digital fascism, fake news, post-truth culture and algorithmic politics circulate on capitalist and state-capitalist Internet platforms. That's digital capitalism. Information war and echo chambers polarise the digital public sphere, making a new World War between imperialist powers that compete at the global level for the control of territory, economic power and political as well as ideological hegemony and

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the nuclear annihilation of humankind and life on Earth more likely. That's digital capitalism.

Digital capitalism matters. Digital capitalism shapes our lives. Digital capitalism needs to be better understood. We need critical theories of digital capitalism. We need to better understand praxes that challenge digital capitalism and aim at fostering digital democracy and digital socialism.

This paper introduces a theoretical notion of digital capitalism that is grounded in Marx's Critique of Political Economy and Marxist Humanism. It wants to answer the question: What is digital capitalism? It provides an answer that does not conceive of capitalism as an economy but as a society and societal formation (Gesellschaftsformation). The argumentation will proceed in the following way: First, the notion of capitalism is clarified (section 2). Then, a notion of digital capitalism is introduced that is based on the notion of capitalism as a societal formation (section 3). In section 4, we engage with Nancy Fraser's concept of capitalism in her book Cannibal Capitalism and discuss what we can learn from it for theorising digital capitalism. In section 5, the outlined understanding of digital capitalism is compared to other definitions. In section 6, the notion of digital capitalism is compared to the concepts of the network society (Manuel Castells), surveillance capitalism (Shoshana Zuboff), and platform capitalism (Nick Srnicek). Section 7 analyses the role of violence in digital capitalism. Section 8 presents some conclusions.

2. What is Capitalism?

Theories of capitalism emerged in the 19th century in the context of industrial capitalism. Classical Political Economists such as Adam Smith (1790/1984, 1776/1976) and David Ricardo (1821) did not use the term capitalism. For example, Ricardo (1821, 49) (1821, p. 49, translation from English) spoke of the existence of the "three classes of landlord, capitalist, and labourer" but not of capitalism as a system.

In the literature, we can find three types of definitions of capitalism: culturalist, economistic, and societal understandings. Culturalists can, for example, be found in Cultural Economy approaches. Karl Marx (1867/1990, 1885/1992, 1894/1981) founded a societal approach to the analysis of capitalism which he called the "Critique of Political Economy". Sociologists like Werner Sombart (2017, 1916/1969), Max Weber (1992), Thorsten Veblen (1899, 1915), and economists like Joseph Schumpeter (1939, 1943) built on Marx's theory and at the same time made it their task to go beyond Marx. While Schumpeter was primarily interested in economic analysis, Sombart, Weber, and Veblen examined cultural dimensions such as the spirit of capitalism, the Protestant ethic, conspicuous consumption, and the leisure class, which they analysed as phenomena outside capitalism and in interaction with it. Sombart, Weber, and Veblen provided economistic definitions.

2.1. Culturalist and Economistic Understandings of Capitalism

Culturalism, as we find it for example in Cultural Economy approaches, (Amin and Thrift 2004; Du Gay and Pryke 2002; Thrift 2005) sees capitalism as cultural, part of culture, discourse, way of life, ethics, system of ideas, and ideal.

Let us have a look at some concrete definitions of capitalism:

> Werner Sombart: "capitalism designates an economic system significantly characterized by the predominance of 'capital' […] The spirit, or the economic outlook, of capitalism is dominated by three ideas: acquisition, competition, and rationality. The purpose of economic activity under capitalism is acquisition, and

> more specifically acquisition in terms of money. The idea of in creasing the sum of money on hand is the exact opposite of the idea of earning a livelihood, which dominated all precapitalistic systems, particularly the feudal-handicraft economy. […] While acquisition constitutes the purpose of economic activity, the attitudes displayed in the process of acquisition form the content of the idea of competition. […] Economic rationality penetrates gradually into other cultural spheres, reaching even those which are only remotely connected with economic life. […] capitalist technology must insure a high degree of productivity. […] The technology characteristic of the capitalist system must also lend itself most readily to improvement and perfection. For constant technical improvements are an important weapon in the hands of the capitalist entrepreneur, who seeks to eliminate his competitor and to extend his market by offering goods superior in quality or lower in price. […] *The Ideal Entrepreneur* combines the traits of inventor, discoverer, conqueror, organizer, and merchant" (Sombart 2017, 4, 6, 9, 11, 12, 15).

Schumpeter saw capitalism as "that form of private property economy in which innovations are carried out by means of borrowed money, which in general, though not by logical necessity, implies credit creation" (Schumpeter 1939, 216) and in which "[c]reative destruction is the essential fact" (Schumpeter 1943, 83). For Veblen, the "capitalistic system" is the "modern economic organization" whose "characteristic features, and at the same time the forces by virtue of which it dominates modern culture, are the machine process and investment for profit" (Veblen 1915, 1).

> Max Weber: "But capitalism is identical with the pursuit of profit, and forever *renewed* profit, by means of continuous, rational, capitalistic enterprise. […] We will define a capitalistic economic action as one which rests on the expectation of profit by the utilization of opportunities for exchange, that is on (formally) peaceful chances of profit. […] Where capitalistic acquisition is rationally pursued, the corresponding action is adjusted to calculations in terms of capital. This means that the action is adapted to a systematic utilization of goods or personal services as means of acquisition in such a way that, at the close of a business period, the balance of the enterprise in money assets (or, in the case of a continuous enterprise, the periodically estimated money value of assets) exceeds the capital, i.e. the estimated value of the material means of production used for acquisition in exchange. […] The important fact is always that a calculation of capital in terms of money is made, whether by modern book-keeping methods or in any other way, however primitive and crude. Everything is done in terms of balances: at the beginning of the enterprise an initial balance, before every individual decision a calculation to ascertain its probable profitableness, and at the end a final balance to ascertain how much profit has been made" (Weber 1992, xxxi-xxxiii).

Schumpeter, Sombart, Veblen, and Weber have in common that they understand capitalism as an economic system. The common denominator of their understandings is that capitalism is an economic system characterised by market competition in commodity sales, rational strategies that aim at maximising profits, and entrepreneurial investment and innovation activity.

Understanding capitalism merely as economy or merely as culture is reductionist. Economic reductionism ignores the logics of accumulation that take place outside of the economy. Cultural reductionism reduces capitalism to an idea, which ignores

aspects of politics and class. Neither economism nor culturalism provide an adequate understanding of capitalism.

2.2. Marx: Capitalism as Formation of Society (*Gesellschaftsformation*)

Marx spoke of the "capitalist society" (Marx 1867/1990, 103, 134, 667, 797, 875, 1063) and "the capitalist mode of production" (Marx 1867/1990, 90, 95, 98, 125, 278, 341, 345, 382, 645, 711). This means that for Marx, capitalism is both a type of economy (*Produktionsweise*, mode of production) and a type of society (*Gesellschaftsformation*, a formation of society/societal formation). Unlike Schumpeter, Sombart, Veblen, and Weber, Marx does not limit the concept of capitalism to the economy but assumes that capitalism means a dialectic of economy and society.

For Marx, the two main features of the capitalist economy are the general production of commodities and the working class's production of surplus-value that the capitalist class appropriates, owns, and converts into profit through the sale of commodities, enabling the accumulation of capital and the reinvestment of capital:

> "Two characteristic traits mark the capitalist mode of production right from the start. *Firstly*. It produces its products as commodities. The fact that it produces commodities does not in itself distinguish it from other modes of production; but that the dominant and determining character of its product is that it is a commodity certainly does so! […] The *second* thing that particularly marks the capitalist mode of production is the production of surplus-value as the direct object and decisive motive of production" (Marx 1894/1981, 1019-1020).

A formation of society is, according to Marx, a "totality" of "the material conditions of life" (Marx 1859, 262). In society, the material conditions of life are constituted by humans' social production processes; social and societal production and reproduction processes form the materiality of society (Fuchs 2020a). Capitalism is a formation of society in which the mass of people is alienated from the conditions of economic, political and cultural production, which means that they cannot control the conditions that shape their lives, allowing privileged groups to accumulate capital in the economy, accumulate decision-making power in politics and accumulate prestige, attention and respect in culture.

Marx repeatedly speaks of an "economic formation of society" (Marx 1867/1990, 92, 345; 1894/1981, 911, 954), which is an indication that he sees the economic system as a particularly important sphere of capitalism and society. Multifactor analyses that postulate a plurality of equally important systems in society cannot explain what society's ground is. But that there is a ground does not mean that one sphere determines what happens in other spheres. The economy conditions, prefigures, circumscribes, enables, constrains, exerts pressure on, sets limits to, and determines in the first instance what is happening in the non-economic spheres of politics and culture.

Unlike Schumpeter, Sombart, Veblen, and Weber, Marx does not limit the concept of capitalism to the economy but assumes that capitalism means a dialectic of economy and society. This differentiation between an economic and a societal understanding of capitalism persists until today. For example, while the French economist Thomas Piketty (2020, 154) defines capitalism as an economic system "that seeks constantly to expand the limits of private property and asset accumulation", the philosopher Nancy Fraser (2022, 145) argues the capitalism "is not an economy, but a type of *society* – one in which an arena of economized activities and relations is marked out and set

apart from other, non-economized zones, on which the former depend, but which they disavow".

The next section will present the foundations of a Marxist-Humanist theory and critique of the political economy of digital capitalism.

3. The Critique of the Political Economy of Digital Capitalism

3.1. Society

In the book *Communication and Capitalism* (Fuchs 2020a), the author of this paper outlines the foundations of a theory of the role of communication and media in capitalism. Building on Raymond Williams's approach to Cultural Materialism, the book argues that social production is the fundamental activity of society and is an economic practice that shapes all areas of society where it also takes on new, non-economic forms. In the economy, humans produce use values that satisfy human needs. In politics, they produce collective decisions. And in culture, they produce meanings of the world. As process (communication) and medium (means of communication), communication and means of communication mediate all social and societal processes in which humans participate. There is a dialectic of work and communication. Humans produce communicatively and they communicate productively. Communication is the production and reproduction process of human sociality and society.

An edifice is a poor metaphor for society. It has often been used as a metaphor in the base/superstructure-model of society. Buildings are static. Everything stands and falls with the base. The base/superstructure-model of society is mechanistic, deterministic, and reductionist. This does, however, not imply, as some pundits claim, that society is an unconnected postmodern plurality of networked differences or a systems-theoretic functional differentiation of autonomous subsystems of society. The subsystems of society are variegated and united at the same time. They have commonalities and differences. The economy unites them by being the source of the logic of social production. Social production originates in the economy but works in all systems and spheres of society, including non-economic ones where humans produce structures that have emergent properties that cannot be reduced to the economy.

The river is a better metaphor for society than the edifice. A river is productive and dynamic. Imagining society as a river means that it is processual, changing, and historical. There is a main current, the economy, that flows into undercurrents and side currents that flow back into the main current. Humans in society constantly produce and reproduce society and sociality at various levels of organisation. They produce use-values in the economy, collective decisions in politics, and meanings in culture. The river is a metaphor for the dynamic reproduction of society and its spheres that encroach on each other.

The economy in the form of social production plays a special role in society. The economy, as Georg Lukács (1986, 448) argues, "circumscribes" (umschreiben) subjectivity and the non-economic. The economy, as Raymond Williams says, is "setting limits, exerting pressures" (R. Williams 1973, 4) on the non-economic. The economy, as Stuart Hall (2021, 156) writes, determines the non-economic not in the last instance but in the "first instance".

3.2. Capitalism

Rivers are not always clean and beautiful. The polluted river is a metaphor for capitalism and class society and how they endanger and pollute humans' everyday lives. "Capitalism is a type of society that is based on and operates within the principle of the

accumulation of capital and power" (Fuchs 2020a, 118). Capitalism is a system that includes the accumulation of monetary capital in the economy, the accumulation of decision-making power in the political system, and the accumulation of prestige and distinction in the cultural system. In all these processes of accumulation, there are winners and losers. Labour as alienated social production has a special role in all these areas of accumulation. In capitalism, the logic of accumulation circumscribes (Lukács) human practices, sets limits and exerts pressures (Williams), and determines human practices in the first instance (Hall).

In a capitalist society, the economy plays a special role because all realms of society are conditioned, shaped, influenced, and circumscribed by the logic of accumulation and by class relations.

Realm of society	Central process in general	Central process in capitalist society	Underlying antagonism in capitalist society	Structural dimension of capitalism
Economy	Production of use-values	capital accumulation	capitalists VS. workers	Class relation between capital and labour
Politics	Production of collective decisions	accumulation of decision-power and influence	bureaucrats VS. citizens	The nation-state
Culture	Production of meanings	accumulation of reputation, attention, respect	ideologues/celebrities/influencers VS. everyday people	Ideology

Table 1: Accumulation as a general process in capitalist society (based on Fuchs 2022a, table 1.2)

Table 1 shows how we can make sense of accumulation as a general process in capitalist society. In capitalism, alienation takes on the form of accumulation processes that create classes and inequalities. Capitalism is based on capitalists' accumulation of capital in the economy, bureaucrats' accumulation of decision-power and influence in the political system, and ideologues', influencers' and celebrities' accumulation of reputation, attention, and respect in the cultural system. Capitalism is an antagonistic system. Its antagonisms (see table 1) drive its development and accumulation. Accumulation is an antagonistic relation that not just constitutes dominant classes and groups but also subordinated, dominated, and exploited groups such as the working class in the capitalist economy, dominated citizens in the capitalist political system, and ideologically targeted everyday people in capitalism's cultural system.

Capitalist society's antagonistic relations that drive accumulation are the source of inequalities and crises, which means that capitalism is an inherently negative dialectical system. As a response to crises, the ruling class and ruling groups require mechanisms they use for trying to keep the dominated class and dominated groups in check so that they do not rebel and revolt. Capitalism, therefore, is also an ideological system where dominant groups use the logic of scapegoating for blaming certain groups for society's ills and problems. Scapegoating entails the logic of the friend/enemy-scheme. And the friend/enemy-scheme can lead to violence, fascism, racism, anti-Semitism, and nationalism. Capitalism has barbaric potentials. Crises of capitalism can be fascism-producing crises that turn barbarism from a potentiality of capitalism into an

actuality. Only class and social struggles for socialism and democracy can keep capitalism's negative potentials in check.

In capitalist society, powerful actors control natural resources, economic property, political decision-making, and cultural meaning-making, which has resulted in the accumulation of power, inequalities, and global problems, including environmental pollution as well as the degradation and depletion of natural resources in the nature-society-relation, socio-economic inequality in the economic system, dictatorships and war in the political system, ideology and malrecognition in the cultural system.

For Marx, class antagonism is a key aspect of the capitalist economy. The working class produces in the unpaid part of the working day surplus-value that is not paid for and is appropriated by capital. "In capitalist society, free time is produced for one class by the conversion of the whole lifetime of the masses into labour-time" (Marx 1867/1990, 667). The members of the working class are via capitalism's dull compulsion of the labour market forced to sell their labour-power and produce capital, commodities, surplus-value, and profits for the capitalist class. The capitalist economy is a class system, in which workers produce commodities with the help of means of production that are the private property of members of the capitalist class. These commodities are sold on commodity markets so that profit is achieved and capital can be accumulated.

Class relations where capital exploits labour form a key feature of the capitalist economy. Workers are alienated from the conditions of production in class society because they do not own the means of production and the products of their labour. The logic of accumulation is not limited to the realm of the economy but extends into the political and cultural realms. We can therefore speak of capitalist *society*. Capitalism is a type of society where the mass of humans is alienated from the conditions of economic, political and cultural production, which means that they do not control the conditions that shape their lives, which enables privileged groups' accumulation of capital in the economy, decision-power in politics, and reputation, attention and respect in culture. Alienation in the economy means the dominant class's exploitation of the working class's labour. Alienation in non-economic systems means domination, i.e., one group benefits at the expense of other groups via means of control such as state power, ideology, and violence. In capitalism, we find the accumulation of capital in the economy, the accumulation of decision-power and influence in politics, and the accumulation of reputation, attention and respect in culture. The key aspect is not that there is growth, but that there is the attempt of the dominant class and dominant groups to accumulate power at the expense of others who as a consequence have disadvantages. Capitalist society is therefore based on an economic antagonism of exploitation between classes and social antagonisms of domination. Table 2 shows the levels and structures of capitalist society.

	Micro-level	**Meso-level**	**Macro-level**
Economic structures	commodity, money	companies, markets	capitalist economy
Political structures	laws	parties, government	the capitalist state
Cultural structures	ideology	ideology-producing organisations	the capitalist ideological system

Table 2: Levels and structures of capitalist society (based on Fuchs 2022a, table 1.1)

3.3. Digital Capitalism

In the book *Digital Capitalism*, the present author has further developed the analysis of communication and capitalism. He sees digital capitalism as a special dimension and organisational form of capitalist society. "Digital capitalism is the dimension of capitalist society where processes of the accumulation of capital, decision-power, and reputation are mediated by and organised with the help of digital technologies and where economic, political, and cultural processes result in digital goods and digital structures. Digital labour, digital capital, the digital means of production, political online communication, digital aspects of protests and social struggles, ideology online, and influencer-dominated digital culture are some of the features of digital capitalism. In digital capitalism, the accumulation of capital and power is mediated by digital technologies. There are economic, political, and cultural-ideological dimensions of digital capitalism. Digital capitalism is an antagonistic dimension of society, a dimension that stands for how the economic class antagonism and the social relations of domination are shaped by and shape digitalisation. Digital capitalism's antagonisms are the class antagonism between digital labour and digital capital, the political antagonism between digital dictators and digital citizens, and the cultural antagonism between digital ideologues and digital humans" (Fuchs 2022a, 312).

Realm of society	Underlying antagonism in capitalist society	Antagonisms in digital capitalism	Examples
Economy	capitalists VS. workers	digital capital VS. digital labour, digital commodity VS. digital commons	The monopoly power of Google, Facebook, Apple, Amazon, Microsoft, etc.
Politics	bureaucrats VS. citizens	digital dictators VS. digital citizens, digital authoritarianism/fascism VS. digital democracy	Donald Trump's use of Twitter and other social media
Culture	ideologues and celebrities VS. everyday people	digital ideologues VS. digital humans, digital hatred/division/ideology VS. digital friendship in culture.	asymmetrical attention economy in popular culture on social media: the cultural power of online-influencers such as PewDiePie (> 100 million followers)

Table 3: The antagonisms of digital capitalism (based on Fuchs 2022a, table 1.4)

Digital capitalism is based on the accumulation of digital capital in the economy, the accumulation of digital decision-power in the political system, and the accumulation of reputation, attention, and respect in culture. Accumulation is an economic logic that in (digital) capitalist society goes beyond the economy where it takes on emergent properties. The economic logic of accumulation determines accumulation in other systems of (digital) capitalism not in the last instance, but in the "*first* instance" (Hall 2021, 156),

economic accumulation “circumscribes” (Lukács 1986, 448), is “setting limits” and “exerting pressures” (Williams 1973, 4) on non-economic accumulation in (digital) capitalist society.

There are economic, political, and cultural-ideological dimensions of digital capitalism. Digital capitalism is an antagonistic dimension of society, a dimension that represents how economic class antagonism and social relations of domination are shaped by and shape digitalisation. The antagonisms of digital capitalism are the class antagonism between digital labour and digital capital, the political antagonism between digital dictators and digital citizens, and the cultural antagonism between digital ideologues and digital humans.

Accumulation in digital capitalism leads to particular forms of the antagonisms characteristic of capitalism. Table 3 provides an overview and examples of these antagonisms. Digital capitalism is an antagonistic society, that is, it is a digital class society and a digital form of domination.

The worsening of crisis situations and social inequalities have led to the rise of authoritarian capitalism in several countries in the last 15 years, in which right-wing demagogues use the Internet to spread fascism, nationalism, and racism (Fuchs 2018a; 2020b, 2022b). There is a dialectic between digital capitalism and authoritarian capitalism and fascism.

Table 4 shows an analysis of the world’s 100 largest companies.

The 18 media and digital corporations included in the analysed ranking were Alphabet/Google, Microsoft, Apple, Samsung, Verizon Communications, China Mobile, Meta Platforms/Facebook, Tencent, Amazon, Deutsche Telekom, Taiwan Semiconductor, Comcast, Alibaba, Nippon Telegraph, Sony, Oracle, Walt Disney, and Cisco Systems.

Table 4 shows that financial capital is the dominant capital faction in the world’s largest 100 corporations. Fossil capital as well as media and digital capital play important roles in the control of profits and revenues. Also manufacturing capital has significant shares of the total sales and profits. The data provide an indication that contemporary capitalism is at the same time financial capitalism, fossil capitalism, media capitalism, digital capitalism, hyperindustrial capitalism, etc. Digital capitalism is one dimension of capitalism. There are many interacting dimensions of capitalism. Capitalism consists of capitalisms. There are dialectics of capitalism that constitute capitalism as formation of society.

Next, we will engage with a book that just like the author’s approach conceives of capitalism as a society: Nancy Fraser’s *Cannibal Capitalism*.

Industry	Type of Capital	Companies	Share of Companies (%)	Share of Sales (%)	Share of Profits (%)	Share of Assets (%)
FIRE	Finance capital	36	36	25.6	29.5	82.3
Media & Digital	Media and digital capital	18	14	19.3	23.6	5.8
Manufacturing	Hyperindustrial capital	16	14	14.3	10.9	4.2
Fossil	Fossil capital	14	14	24.1	26.8	4.6
Phamaceutical	Bio-capital	8	8	5.3	5.1	1.5
Conglomerates		3	3	2.1	1.2	0.6
Retail	Sales capital	3	3	6.7	1.9	0.5
Construction	Construction capital	1	1	2	0.4	0.5
Transportation	Transportation capital	1	1	0.7	0.6	0.1

Table 4: Share of specific types of capital in the world's largest 100 corporations' number, sales, profits, and capital assets (data source: Forbes 2000, year 2023)

Coding of industries:

- Construction
- Digital: IT & software services, media, semiconductors, technology hardware & equipment, telecommunications services
- FIRE: banking, diversified financials, insurance
- Manufacturing:
  aerospace and defence, capital goods, consumer durables; food, drink & tobacco; household & personal products, materials
- Fossil: oil and gas operations
- Pharmaceutical: drugs & biotechnology
- Retail: retailing
- Transportation

4. Cannibal Capitalism: The Interaction of the Economy and Non-Economic Conditions of Possibility in Capitalism

Nancy Fraser is a critical theorist, philosopher, and social and political theorist. She has been involved in theory construction and debates in the context of feminism, justice, the public sphere, and capitalism. Her book Cannibal Capitalism: How Our System Is Devouring Democracy, Care, and the Planet and What We Can Do About It (Fraser 2022) is a very notable and interesting contribution to theorising capitalism. It should be interesting to anyone who asks themselves: What is capitalism?

Dimension of Capitalism	Contradiction	Central Processes	Structures	Crises
Economy	capital/labour	Class-based exploitation, commodification, wage-labour	Private property in the means of production, double-free wage labour, capital accumulation, markets	Economic crises
Reproduction	production/reproduction	Gender domination, unwaged and underwaged care work	Households, neighbourhoods, educational institutions, families	Crises of care
Nature	humanity/non-human nature	land grabbing (*Landnahme*),	Land, minerals, energy, raw materials, foodstuffs air, water, atmosphere	Ecological crises
Polity	polity/economy, national/international, core/periphery	Political domination	Nation-states, public goods and public power (legal order, repressive forces, infrastructures, money supply, mechanisms for crisis management), civil societies, political organisations	Political crises (of governance and hegemony), crises of democracy
Racism/Imperialism	exploitation/expropriation	racialised expropriation, racial and imperial oppression, racialised accumulation, violence, theft	Wealth created by subjugated peoples	The globalisation of crises of the economy, care, ecology and polity/democracy

Table 5: An overview of Nancy Fraser's concept of capitalism and its dimensions

Fraser (2022) argues that capitalism is "something larger than an economy" (17). "Capitalism is not an economy, but a type of society – one in which an arena of economized activities and relations is marked out and set apart from other, non-economized zones, on which the former depend, but which they disavow" (145). It is "an institutionalized societal order that encompasses not only 'the economy' but also those activities but also those activities, relations, and processes defines as non-economic, that make the economy possible" (82). The capitalist economy has "non-economic conditions of

possibility" (81). Capitalism is a societal order where the "economic system defined by private property, the accumulation of 'self'-expanding value, the market allocation of social surplus and of major inputs to commodity production, including (doubly) free labor, is rendered possible by four crucial background conditions, concerned, respectively, with social reproduction, the earth's ecology, political power, and ongoing infusions of wealth expropriated from racialized peoples" (17).

Fraser argues that there are hidden abodes of capitalism that are "background conditions of possibility for exploitation" (8) and that capitalism's "economic foreground features depend on non-economic background conditions" (17). She in this context utilises the categories of cannibalisation, expropriation, ongoing primitive accumulation, dispossession, and enclosure.

For Fraser, capitalism is a societal order where economic processes of exploitation interact with five non-economic processes, namely patriarchy, racism, imperialism, nature, and politics. In table 5, I have attempted to summarise Fraser's theoretical approach to capitalism.

The advantage of Fraser's approach is that she sees capitalism as something larger than just an economy. This reflects Marx's insight that capitalism is a *Gesellschaftsformation* (a formation of society, societal formation). For theorising digital capitalism, we can learn from Fraser that it is important how we look at the dialectics of the economic and the non-economic within the capitalist formation of society when analysing digitalisation. We can also learn from Fraser that when talking about capitalism we should look at how class relations interact with gender relations, racism, and power structures in general.

There are also theoretically troubling aspects of Fraser's approach. In Fraser's analysis, there is no cultural and ideological dimension where the media, meaning-making, communication, discourse and ideology play a role. The term "ideology" is mentioned a single time in Cannibal Capitalism. Fraser leaves unclear what role ideology plays in capitalism. Commodity fetishism, classism, racism, sexism, fascism, etc. not only, but also have ideological dimensions that are located inside of capitalist society.

She has a pluralist view of capitalism where the five realms of capitalism have their own "distinctive normative and ontological grammars" (18). The implication is that patriarchy, racism, imperialism, nature, and politics do not have their own economies and do not have internal economic aspects but are mediated by the economy that is in her approach external to these systems. For Fraser, there is no common logic that binds together all realms of capitalism. Her analysis is a dualistic, multifactor, pluralist analysis of capitalism.

Extractive and agricultural work transforms nature into natural resources that enter the economic production process. Therefore, nature has economic aspects. In society, the human-nature-metabolism is part of the economy. Nature, patriarchy, imperialism, polity, and racism are not purely non-economic realms, but all have aspects of labour, namely agricultural labour, care and reproductive labour, outsourced labour in the Global South, political work in political organisations and public service work in public organisations, and racialised labour. Fraser analyses such forms of labour but nonetheless speaks of "non-economic conditions of possibility" (81) of the capitalist economy.

A dialectical analysis of society can avoid pluralism and dualism by seeing the economic as operating both inside and outside the economy in the form of social production. All realms of society have economic, political and cultural dimensions. Social production is the basic process in society. All realms, social relations, groups,

organisations, and institutions have an economy of social production as well as emergent qualities that cannot be reduced to the economic dimension. In capitalism, the logic of accumulation shapes many social systems in so far as they are part of capitalism. What Fraser (2022) terms *boundary struggles* are struggles for or against the subsumption of social relations under the logic of accumulation. Accumulation means the logic of quantification and "always more and more" so that one group amasses resources which creates deprived humans, deprived spaces, and unequal distributions. The class system, patriarchy, and racism are social systems. Each of these social systems has an economic, a political and a cultural dimension. They are neither purely economic nor purely non-economic. In capitalism, the class system necessarily interacts with all other systems, including patriarchy and racism, which means there is always a class dimension to domination.

Capitalism as a societal formation is the interaction of the class system and systems of domination so that dominant groups accumulate economic capital, political power and cultural hegemony. All of these systems have their own specific economies and structures of accumulation. Fraser somewhat disregards that what she terms *the non-economic conditions of possibility of capitalism* are not entirely non-economic but have economic aspects, which means that the economy and class are at work also outside of wage-labour.

For Fraser, racism and patriarchy are located inside of capitalism as non-economic conditions of possibility of capital accumulation. While there are interests in capitalism that seek to advance the overexploitation of labour, which today includes racially discriminated labour and reproductive/care workers, capitalism is a flexible, dynamic system that has the possibility to create and dissolve milieus of over-exploitation and expropriation. Therefore, it might be the case that a green capitalism, a non-racist capitalism, or a non-patriarchal capitalism emerges when other milieus of expropriation and over-exploitation are created.

4.1. Capitalism, Racism, and Patriarchy

Capitalism, patriarchy, and racism are societal systems that each have an economic, a political and a cultural dimension (see table 6). Capitalism, racism, and patriarchy are three forms of power relations and societal modes of production that combine economic alienation, political alienation, and cultural alienation respectively. Capitalism, racism, and patriarchy involve specific forms of exploitation, domination, and ideology. These are three modes of societal production.

Patriarchy and racism are dialectically articulated with capitalism. Capitalism subsumes racism and patriarchy but can also detach itself from these societal modes of production and subsume other modes of production for economic purposes (over-exploitation), political purposes (domination), and cultural purposes (ideology).

Patriarchy and racism predate and have been subsumed under capitalism, where they are milieus of over-exploitation and ideologies and forms of friend/enemy-politics and militaristic politics. Patriarchy and racism as two capitalist milieus can break away from capitalism if they are decoupled from the logic of accumulation. Capitalism then seeks other milieus of over-exploitation, ideologisation, and militarisation.

	Capitalism	Racism	Patriarchy
Economic dimension	The exploitation of the working class	The exploitation and super-exploitation of racialised groups	The exploitation and super-exploitation of gender-defined groups, including housework, female care workers, and female wage-workers
Political dimension	Bureaucratic discrimination of, surveillance of, state control of, and violence directed against dominated classes (such as wage-workers, slave-workers, precarious workers etc.)	Bureaucratic discrimination of, surveillance of, state control of, and violence directed against racialised groups	Bureaucratic discrimination of, surveillance of, state control of, and violence directed against gender-defined groups
Cultural-ideological dimension	Denial of voice, respect, recognition, attention, and visibility of the working class, ideological scapegoating of the working class	Racist ideology: the assumption that race exists as cultural and/or biological essence; denial of voice, respect, recognition, attention, and visibility of racialised groups, ideological scapegoating of racialised groups	Denial of voice, respect, recognition, attention, and visibility of gender-defined groups, ideological scapegoating of gender-defined groups

Table 6: The economic, political and cultural-ideological dimensions of capitalism, racism, and patriarchy as societal modes of production (based on Fuchs 2021, table 10.4)

Capitalism, racism, and patriarchy interact in particular ways that are shown in table 7. With respect to digitalisation, there are various forms of interaction of digital capitalism, digital racism, and digital patriarchy.

	Capitalism	Racism	Gender-related oppression, patriarchy
Capitalism	Exploitation	Racist exploitation	Gender-structured exploitation
Racism	Racist exploitation	Racism	Discrimination of racialised individuals or groups of a particular gender
Gender-related oppression, patriarchy	Gender-structured exploitation	Discrimination of racialised individuals or groups of a particular gender	Gender-based discrimination

Table 7: The interaction of capitalism, racism, and patriarchy (based on Fuchs 2021, table 10.5)

4.2. David Harvey: Universal Alienation in Capitalism

David Harvey argues that it is important to analyse the interaction of capitalism, patriarchy, and racism and holds that the latter two are located outside of capitalism:

> "Contemporary capitalism plainly feeds of gender discriminations and violence as well as upon the frequent dehumanisation of people of colour. The intersections and interactions between racialisation and capital accumulation are both highly visible and powerfully present. But an examination of these tells me nothing particular about how the economic engine of capital works, even as it identifies one source from where it plainly draws its energy. […] wars, nationalism, geopolitical struggles, disasters of various kinds all enter into the dynamics of capitalism, along with heavy doses of racism and gender, sexual, religious and ethnic hatreds and discriminations" (Harvey 2014, 8).

Harvey (2018) speaks of universal alienation for arguing that exploitation and alienation extend beyond wage-labour into realms such as reproductive labour, racialised labour, commodity distribution and sale, consumption, housing, health care, education, nationalism, racism, police violence, finance, urban development, etc (Fuchs 2018b). Alienation in the economy not just entails capital's exploitation of labour, but also the realms of realisation, distribution, and consumption, which means it extends to phenomena such as unemployment, consumerism, land seizure, deindustrialisation, debt peonage, financial scams, unaffordable housing, high food prices, etc. Alienation entails processes beyond the economy, such as frustrations with politics, unaffordable public services, nationalist ideology, racism, police violence, militarism, warfare, alcoholism, suicide, depression, bureaucracy, pollution, gentrification, or climate change. Alienation entails the geographic and social expansion of capital accumulation so that capital relations "dominate pretty much everywhere" (Harvey 2018, 427). "Alienation is everywhere. It exists at work in production, at home in consumption, and it dominates much of politics and daily life" (Harvey 2018, 429).

Struggles against alienation, including struggles against racism and sexism, would have to be put together with working-class struggles. Harvey (2023) criticises identity politics that forgets class politics. There is a problem "to the degree that identity politics are seen in isolation from the totality of the social process" (Harvey 2023, 162). Class

would stand in relation to all non-class issues. “Class is not an exclusive category of analysis, but it is central to any politics that seeks to challenge the crises caused by capitalism” (Harvey 2023, 164).

4.3. Digital Capitalism, Digital Patriarchy, Digital Racism: An Example

Let's look at an example of the interaction of capitalism, patriarchy, and racism from the realm of digital media. As public discussion of the diversity of society has become of increasing importance, large companies have moved to produce specific sections on diversity or their own diversity reports as part of their Corporate Social Responsibility reports. Meta Platforms, the company formerly known as Facebook, produces an annual diversity report.

The Meta Diversity Report 2022 was written by Meta’s Chief Diversity Officer Maxine Williams (2022). Meta reports that the diversity of its employees in terms of gender and ethnicity has increased. The report is written in a completely positivist language that communicates constant progress and does not address structural problems. Meta is said to be “building products with people from diverse backgrounds and perspectives”. For Meta, diversity is about quantifiability and indicators which, according to Meta, show that “Our Workforce and Leadership Diversity Continue to Grow”. Meta says it is an inclusive project: “And so, together, through dedication and innovation, we'll strive to make social media, the metaverse and all the people who rely on, work with or work for Meta an ever more inclusive global community”.

	2018	2019	2022	2021	2022
Men workers	63.7	63.1	63.0	63.3	62.9
Women workers	36.3	36.9	37.0	36.7	37.1
White workers	46.6	44.2	41.0	39.1	37.6
Asian workers	41.4	43.0	44.4	45.7	46.5
Afro-American workers	3.5	3.8	3.9	4.4	4.9
Men tech workers	78.4	77.0	75.9	75.2	74.2
Women tech workers	21.6	23.0	24.1	24.8	25.8
Men managers	70.0	67.4	65.8	64.5	63.3
Women managers	30.0	32.6	34.2	35.5	36.7
White managers	69.7	65.4	63.2	60.9	57.6
Afro-American managers	2.4	3.1	3.4	4.7	4.9
Asian managers	21.6	24.9	25.4	26.1	28.6
Men non-tech workers	43.0	42.8	41.5	40.4	39.5
Women non-tech workers	57.0	57.2	58.5	59.6	60.5
White non-tech workers	53.9	52.5	49.4	48.0	47.2
Afro-American non-tech workers	7.6	8.2	8.9	10.1	11.2
Asian non-tech workers	24.5	24.7	24.5	23.9	23.1

Table 8: The development of the composition of Meta Platforms’ workforce in the USA, in percent, data source: https://about.fb.com/news/2022/07/metas-diversity-report-2022/, accessed on March 23, 2023

Table 8 presents data on the development of the social composition of Meta Platforms’ workforce in the USA.

In the field of software engineering, although the proportion of men at Meta has decreased from 78.4 per cent in 2018 to 74.2 per cent in 2022, a proportion of 25.8 per

cent of women in 2022 is still very low (see table 8). The focus on quantitative diversity indicators here ignores the fact that computer science's focus on the quantifiability and algorithmisation of the world, which is the dominant paradigm of software development, reproduces the patriarchal division of the world into quantity/quality, mathematics/social, technology/society, men/women, rationality/emotionality, nature/culture, individualism/socialism, abstract/concrete, etc. The dominant paradigm of computer science is inherently patriarchal. Software development as a profession tends to be pure engineering, ignoring the societal dimension, which has to do with issues of power and the application of software in society, and therefore with shaping society. Quantifying diversity cannot undo the structural problems of the interaction of patriarchy, racism, and digital capitalism. Meta ignores structural power relations in its diversity report. Diversity is treated as an engineering problem that can be solved by indicators. The company is blind to societal issues.

Meta's diversity indicators only refer to the ethnicity and gender of employees, while class aspects are simply ignored. The ratio of the wages of the lowest-paid workers to the highest managerial salaries, annual profits and dividends is not discussed and analysed. Similarly, aspects of value creation through paid wage labour and the unpaid labour of users, whom Kylie Jarrett (2016) calls digital houseworkers and digital housewives, are ignored. The exploitation of labour does not matter. The economic sector of social media is not diverse at all but consists of monopolies controlled by corporations like Alphabet (Google) and Meta Platforms. If diversity issues were taken seriously, there would also have to be a discussion on how monopoly profits can be abolished and non-commercial Internet platforms such as platform cooperatives and public Internet platforms (Fuchs and Unterberger 2021; Scholz and Schneider 2016, 2016) can be strengthened.

In the area of non-technical employees at Meta Platforms, the proportion of women has increased from 57.0% in 2018 to 60.5% in 2022 (see table 8). The proportion of Afro-Americans has increased from 7.6% to 11.2% over the same period (see table 8). This sector has the lowest wages, so the increase in diversity in this sector is simply an increase in diversity of exploitation. Wage levels and working conditions of different employment groups and especially the lowest-paid workers such as cleaners are not discussed in Meta's diversity report. At and on Facebook, cleaners are not only people who clean offices, but also content moderators primarily employed in developing countries who moderate and delete images of horror (beheadings, torture, child abuse, suicide, etc.) uploaded to the platform (Roberts 2019). The outsourcing of this work to the Global South is done with the aim of saving costs. Internet cleaners conduct extremely horrific work that is psychologically distressing, which is usually done unwillingly, done by poor people who desperately need money.

Meta's diversity report has ideological aims and seeks to present as progressive a company that has monopoly status and makes profit through the exploitation of digital labour.

In the diversity-washing practised by Meta and other corporations, "there is both an idealistic and positivistic approach to identity. Instead of being a historically developed relationship, positive occupations of marginalised identities are presented to us as a response to real oppression. The underlying relationship between capital and labour remains obscured"[1] (Roldán Mendívil and Sarbo 2022, 112). The goal is the diversity of exploitation, to make exploitation more diverse.

[1] Translated from German: „es einen sowohl idealistischen als auch positivistischen Umgang mit Identität. Statt als historisch gewachsenes Verhältnis werden uns Positivbesetzungen von

We have thus far outlined an understanding of digital capitalism that is based on the notion of capitalism as formation of society. In the next section, we will discuss other definitions of digital capitalism.

5. Definitions of Digital Capitalism

5.1. Foundations

The earliest mention of the term "digital capitalism" that I was able to trace was in a 1993 article in *Forbes* magazine, where Robert Lenzner, a *Forbes* senior editor, and Forbes reporter William Heuslein wrote the issue's cover story titled "The Age of Digital Capitalism" (Lenzner and Heuslein 1993). The article describes "computerized financial instruments" (63), derivatives such as options, futures, currency forwards, interest-rates swaps, options on futures and swaps, etc. "Computers make all this magic [of derivatives] possible. […] Think of all this as an adult Nintendo game with big dollar signs attached" (63).

Digital technologies have played an important role in finance capitalism. Ironically, the financial instruments that *Forbes* celebrated at the time of the popularisation of the World Wide Web fifteen years later played an important role in the global economic crisis that started in 2008.

Dan Schiller (1999) published the first book that contained the term "digital capitalism" in its title: *Digital Capitalism. Networking the Global Market System*. He sees the Internet as a means of the globalisation of capitalism:

> "Networks are directly generalizing the social and cultural range of the capitalist economy as never before. That is why I refer to this new epoch as one of *digital capitalism.* The arrival of digital capitalism has involved radical social, as well as technological, changes. […] As it comes under the sway of an expansionary market logic, the Internet is catalyzing an epochal political-economic transition toward what I call digital capitalism – and toward changes that, for much of the population, are unpropitious" (Schiller 1999, xiv, xvii).

5.2. Four Example Definitions of Digital Capitalism

In this section, we will look at the approaches to analysing digital capitalism by Philipp Staab, Sabine Pfeiffer, Jathan Sadowski, and Michael Betancourt.

5.2.1. Philipp Staab: Digital Capitalism as Privatised Mercantilism

Philipp Staab's (2019) book *Digitaler Kapitalismus* (*Digital Capitalism*) builds on Schumpeter's analysis of monopoly capitalism on the one hand, but on the other hand emphasises that today one has to go beyond Schumpeter, as digital goods are not scarce and Internet platforms such as Apple, Amazon, Google, and Facebook are Internet platforms that represent markets that are privately owned. "Digital capitalism must not be thought of from the problem of scarcity, but from a logic of non-scarcity. Its leading companies are not rational producer monopolies, but proprietary markets. Its dynamics feed less on the logic of entrepreneurial action than on the calculations

marginalisierten Identitäten als Antwort auf reale Unterdrückung präsentiert. Das dieser Unterdrückung zugrundeliegende Verhältnis von Kapital und Arbeit bleibt damit verschleiert".

of rentiers. The goal is not maximum production, but the capitalisation of actually non-scarce goods"[2] (Staab 2019, 27).

Staab argues that the digital giants are rentier capitalists that extract value. "Proprietary markets, on the other hand, generate profits as rents from market ownership. Their positioning at the interface between producers and consumers allows them to collect commissions on market transactions with relatively low fixed and variable costs"[3] (47). For Staab, digital capitalism is a privatised mercantilism. In classical mercantilism, the state-promoted trade monopolies (49), in digital capitalism there is "the conquest of the market itself by a small number of private-sector enterprises"[4] (50). Staab summarises his findings on digital capitalism as follows:

> "Digital capitalism should not be thought of (as Schumpeter did industrial capitalism) from the problem of scarcity, but from a logic of non-scarcity. Its leading companies are not rational producer monopolies, but proprietary markets whose core operation is the extraction of economic rents. Its dynamics therefore feed less on the logic of entrepreneurial action than on the calculations of rentiers. The goal is not maximum production, but the capitalisation of actually non-scarce goods. The effect of this constellation is not the death of capitalism, as Schumpeter once expected, but the radicalisation of its basic features, especially social inequality"[5] (Staab 2019, 259).

Staab's analysis has not only received approval (Haug 2020; Schmiede 2018), but has made an important contribution to the discussion of digital capitalism in Germany.

5.2.2. Sabine Pfeiffer: Digital Capitalism as Distributive-Force Capitalism

In her book *Digital Capitalism and Distributive Forces*, Sabine Pfeiffer (Pfeiffer 2022, 23) characterises digital capitalism as a new phase of capitalism that she characterises as "distributive-force capitalism". She refers to advertising, marketing, transport, storage, planning, and forecasting as distributive forces. For Pfeiffer, distributive forces are "all the technological and organisational measures and activities related to value

[2] Translated from German: „Den digitalen Kapitalismus darf man nicht vom Problem der Knappheit her denken, sondern aus einer Logik der Unknappheit. Seine Leitunternehmen sind keine rationalen Produzentenmonopole, sondern proprietäre Märkte. Seine Dynamik speist sich weniger aus der Logik des unternehmerischen Handelns als vielmehr aus den Kalkülen von Rentiers. Ziel ist nicht die maximale Produktion, sondern die Kapitalisierung eigentlich unknapper Güter".

[3] Translated from German: „Proprietäre Märkte hingegen erwirtschaften Profite als Renten aus Marktbesitz. Ihre Positionierung an der Schnittstelle zwischen Produzenten und Konsumenten ermöglicht es ihnen, mit relativ geringen fixen und variablen Kosten Provisionen für Markttransaktionen einzustreichen"

[4] Translated from German: „ist der digitale Kapitalismus die Eroberung des Marktes selbst durch eine kleine Zahl privatwirtschaftlicher Unternehmen"

[5] „Den digitalen Kapitalismus sollte man nicht (wie Schumpeter den Industriekapitalismus) vom Problem der Knappheit her denken, sondern aus einer Logik der Unknappheit. Seine Leitunternehmen sind keine rationalen Produzentenmonopole, sondern proprietäre Märkte, deren Kernoperation in der Extraktion ökonomischer Renten besteht. Seine Dynamik speist sich daher weniger aus der Logik unternehmerischen Handelns, als vielmehr aus den Kalkülen von Rentiers. Ziel ist nicht die maximale Produktion, sondern die Kapitalisierung eigentlich unknapper Güter. Effekt dieser Konstellation ist nicht das Sterben des Kapitalismus, wie es Schumpeter einst erwartete, sondern die Radikalisierung seiner Grundzüge, insbesondere der sozialen Ungleichheit".

realisation, the intention of which is, *secondly*, to guarantee the constant expansion of this value realisation, ensure this expansion in the long term and to do so at the lowest possible circulation costs. This is precisely where digitalisation and digital business models have proven particularly promising" (13).

Sabine Pfeiffer explains the rise of Google, Facebook, Amazon, and other digital giants as a consequence of the transition to distributive-force capitalism. That which "is new in digital capitalism may not be located on the side of value generation but on the side of value realisation" (Pfeiffer 2022, 19). According to Pfeiffer, digitalisation has driven the development of those distributive forces, resulting in a capitalism in which distributive forces play a key role. For her, digital capitalism is a capitalism of distribution. Although not everyone will agree with a strong focus on distribution that does not so much focus on computing as means of production and prosumption, Pfeiffer's approach is an important contribution to the analysis of digital capitalism.

5.2.3. Nathan Sadowski: Digital Capitalism as Data Extraction

In the book *Too Smart. How Digital Capitalism is Extracting Data, Controlling our Lives, and Taking Over the World*, Nathan Sadowski defines digital capitalism as "capitalism with digital technologies" (49). He emphasises the role of smart technologies, that corporate data collection is "*theft and/or exploitation*" (55), and that Silicon Valley drives the ideology of tech solutions. He also says that Internet platforms are "*the new landlords of digital capitalism*" (61).

Schiller, Sadowski, and others have a more structuralist approach to digital capitalism, emphasising the role of digital communication networks such as the internet, data and digital technologies. Other approaches are more action-oriented and emphasise aspects of digitally mediated knowledge production.

5.2.4. Michel Betancourt: Digital Capitalism as Immaterial Production

For example, Betancourt (2015) in his book *The Critique of Digital Capitalism* understands digital capitalism as a "shift towards an economy based upon digital technology" (216), in which "immaterial production" (ii) and "immaterial valorization" are important (viii), creating the "illusion of production without consumption" (196) and "the substitution of immaterial values for physical production" (215), thus driving financialisation and financial crises.

Betancourt emphasises the role of computers as a means of production of digital capitalism, whereby data is generated. He says that in digital capitalism, our devices are not only commodities, but also a means of data production. By monitoring every interaction and communicating with each other, smart devices can collect valuable data about users' habits and preferences. He uses the term immaterial production: "Immaterial production is characteristic of digital capitalism, and (equally characteristically) presents itself as something *other* than a commodity form: the impact of the *aura of information.* This aspiration is digital capitalism's attempt to create a complete description of all *information as instrumentality* (data) where the disconnected, contextless dimensions of *all* activities performed within the digital realm become equally valid, and *valuable,* to immaterial production as commodities" (ii).

Betancourt's emphasis on immaterial labour shows parallels with theories of cognitive capitalism (Moulier-Boutang 2011; Hardt and Negri 2000). The talk of "immaterial" labour and "immaterial" commodities often leaves unanswered the question of what we mean by "material" and "materiality". It tends to be based on a vulgar understanding of materialism where matter is everything you can touch and feel. In contrast,

a cultural materialist approach assumes that everything is material because it is produced and is a product (Fuchs 2020a; R. Williams 1977).

5.3. Digital Capitalism as Digital Dimension of the Capitalist Formation of Society

The four approaches just discussed make important contributions to understanding digital capitalism in particular respects. Staab analyses the monopoly character of digital capitalism, Pfeiffer aspects of digital distribution, Sadowski the phenomenon of data extraction and Betancourt the production of digital information as a non-material commodity. What these approaches have in common is that they understand digital capitalism as a way of organising the economy, i.e., as an economic system.

The approach advanced by the author of this paper shares the economic focus of the works just discussed. Class and class transformations are key features of digital capitalism. But the present author's approach goes beyond the purely economic understanding of digital capitalism. The exploitation of digital labour is an aspect of digital capitalism. But it is also digital capitalism when influencers try to accumulate likes and followers on social media platforms on Instagram and TikTok. The logic of the cultural accumulation of reputation is at play on Instagram and TikTok. And it is also digital capitalism when fascists and authoritarians use bots and spread fake news and disinformation online in order to try to undermine democracy. The logic of the accumulation of political power shapes online fake news. Accumulation processes do not just exist in the (digital) economy, but also in (digital) politics and culture. The accumulation logic of the digital capitalist economy shapes digital capitalist politics and digital capitalist culture that have their own specific emergent qualities and relative autonomy. Capitalism is, as we can learn from Nancy Fraser, more than an economy. Digital capitalism is more than a digital economy.

Contemporary society and digital technologies' roles in it have not just been characterised as digital capitalism but also with concepts such as network society, surveillance capitalism, and platform capitalism. We will discuss these notions in the next section.

6. Digital Capitalism, Network Society, Surveillance Capitalism, Platform Capitalism

6.1. The Analysis of Knowledge and Digital Media in Marxist Theory

In Marxist theory, there is a long history of the analysis of knowledge in capitalism that goes way back to Marx. We can here not cover and reflect on this history properly, but merely mention some examples.

In the *Grundrisse,* Marx argued that the "development of fixed capital indicates to what degree general social knowledge has become a *direct force of production*, and to what degree, hence, the conditions of the process of social life itself have come under the control of the general intellect and been transformed in accordance with it" (Marx 1857/1858/1993, 706). Marx anticipated the rising importance of knowledge in production as a consequence of the development of the productive forces. In his study of the *Grundrisse*, Roman Rosdolsky comments that Marx here foresaw "the development of machinery as an automatic system" and stresses that emancipation from exploitation requires "that the development of machinery" facilitates the "radical reduction of working time" as foundation of "the abolition of class society" (Rosdolsky 1977, 243). Rosdolsky highlights that Marx analyses the antagonisms of technology in capitalism.

In debates on democratising socialism, Radovan Richta (1969/2018) at the time of the Prague Spring stressed that democratic socialism needed the use of computers as

one of its material foundations. In this context, he coined the notion of the scientific and technological revolution. He argues that science and technology have become key productive forces, which reflects Marx's insights in the *Grundrisse* about the general intellect: "New productive forces, first and foremost *science* and its application in technology, are entering the production process on all fronts, and with them goes the base of all scientific activity – social integration and finally the growth of human capacities that underlies all creative activity. […] Science is now penetrating all phases of production and gradually assuming the role of the central productive force of human society and, indeed, the 'decisive factor' in the growth of the productive forces" (Richta 1969/2018, 26, 28) (Richta 1969, 28).

On the one hand, Richta stresses that the scientific and technological revolution has been embedded into the dialectic of capitalism's continuity and discontinuity: "Some people believe that capitalism has undergone a complete regeneration, others are loath to admit any substantial modification. The reality is, however, more complicated. In its social and class basis, capitalism has not changed, but there has been a substantial change in the conditions under which the self-expansion of capital can and is taking place; this imposes a new relationship to the productive forces, and important innovations throughout the reproduction process" (62). On the other hand, he points out computing's and the scientific and technological revolution's potentials to act as material foundation of democratic socialism: "The new status of science in society and the approaching shift of revolutionary strivings to new domains are coming to the fore: the economics of human resources assumes new significance, new conditions present themselves for shaping the socialist way of life and there is a growing need to solve the difficult problem of participation in civilization, to develop democratic forms of social life and so on" (19).

Since the 1950s, there have been Marxist theory debates on computer-based automation in capitalism. Contributors have included, for example, Friedrich Pollock (1966), Harry Braverman (1974), Projektgruppe Automation und Qualifikation (1975, 1987), André Gorz (1982), David Noble (1984), and many others. Whereas some have expected that computer-based automation will bring about the end of work, which has been interpreted as either the rise of post-scarcity socialism or mass unemployment and de-qualification, others have argued that new jobs and skills are emerging. Similar debates are underway today in the context of AI-based automation (Butollo and Nuss 2022; Steinhoff 2021; Srnicek and A. Williams 2015).

Let us briefly mention one of the Marxist works on automation. André Gorz (1982) says that "post-industrial society" (81) has transformed capitalism and that computer-based automation has "eliminated most skills and possibilities for initiative" (28) and is "in the process of replacing what remains of the skilled labour force (whether blue or white collar) by a new type of unskilled worker" (28) so that a post-industrial neo-proletariat has emerged. He sees automation as antagonistic and, therefore, argues that it has brought about potentials for abolishing the proletariat and capitalism and establishing what he terms a "post-industrial socialism" (82) where "the time spent on heteronomous labour is to be reduced to a minimum" so that "the mass of socially necessary labour" is "distributed among the population as a whole in such a way that the average working day reduced to a few hours" (101) and there is the "abolition of work" along with "the development of autonomous activity" and the "liberation of time" (2).

Although again and again criticised for various reasons, it cannot be denied that the books by Michael Hardt and Antonio Negri have given an important impetus to Marxist theory, also in respect to the analysis of computing and digitalisation. In *Empire*, Hardt and Negri (2000) argue that a "postmodern capitalism" (397) has emerged

that is shaped by the dominance of what the two authors term "immaterial labour", a notion they base on Marx's concept of the general intellect (29): "The central role previously occupied by the labor power of mass factory workers in the production of surplus value is today increasingly filled by intellectual, immaterial, and communicative labor power" (29). Immaterial labour, according to Hardt and Negri, has three key features: "the communicative labor of industrial production that has newly become linked in informational networks, the interactive labor of symbolic analysis and problem solving, and the labor of the production and manipulation of affect" (30). In this age of immaterial labour, the proletariat is not limited to industrial labour but exists all over society, which includes and many realms of non-wage-labour. "*In postmodernity the social wealth accumulated is increasingly immaterial; it involves social relations, communication systems, information, and affective networks. Correspondingly, social labor is increasingly more immaterial; it simultaneously produces and reproduces directly all aspects of social life. As the proletariat is becoming the universal figure of labor, the object of proletarian labor is becoming equally universal. Social labor produces life itself"* (*258).*

Building on Negri and other works in Autonomous Marxism, Nick Dyer-Witheford in his book *Cyber-Marx* argues that computing and the Internet are at the heart of what he terms "a post-Fordist, postmodern, informational capitalism" (7) that is highly antagonistic and has new potentials for "the common sharing of wealth" (2) and "an information-age communism" (13). In the Autonomous tradition, various authors have spoken of the emergence of a cognitive capitalism (Moulier-Boutang 2011; Vercellone 2007). Vercellone (2007, 16) understands cognitive capitalism as a stage of capitalist development where the "relation of capital to labour is marked by the hegemony of knowledges, by a diffuse intellectuality, and by the driving role of the production of knowledges by means of knowledges connected to the increasingly immaterial and cognitive character of labour". For Moulier-Boutang (2011, 56-57), cognitive capitalism is a "system of accumulation, in which the accumulation is based on knowledge and creativity, in other words on forms of immaterial investment. […] By cognitive capitalism we mean, then, a mode of accumulation in which the object of accumulation consists mainly of knowledge, which becomes the basic source of value, as well as the principal location of the process of valorisation".

My approach of analysing digital capitalism stands in a rich tradition of Marxist theory where a multitude of concepts such as the general intellect, the scientific and technological revolution, post-industrial capitalism, post-industrial socialism, immaterial labour, cognitive capitalism, etc. have been coined. One can, of course, spend lots of time engaging with and criticising each of these concepts. The important point is, however, that within Marxist theory, a theoretical and analytical strand has emerged that is focused on the roles that digital media and digital communication play in and beyond capitalism. My works are a contribution to this type of Marxian analysis and theory construction.

Why do I suggest the use of the term "digital capitalism"? Aren't there other, better concepts? There is indeed a multitude of critical concepts that theorise and analyse the role of digital technologies in capitalism. On the one hand, they include notions such as data capitalism, platform capitalism, high-tech capitalism, informatic capitalism, cybernetic capitalism, media capitalism, cyber-capitalism, or virtual capitalism. On the other hand, there are notions such as cognitive capitalism, knowledge capitalism, semio-capitalism, communicative capitalism, intellectual capitalism, or mental capitalism.

The first series of notions is focused on technological structures, i.e., objects. In contrast, the second series of notions is focused on ideas and culture, i.e., subjectivity. Primarily employing one of these terms therefore tends to solve the social theory problem of what roles structures and practices play in society in favour of either objects (structures, technologies) or subjectivity (ideas, practices). There is, however, a dialectic of structures and practices: Structures condition, enable, and constrain practices that result in the production and reproduction of social structures that again condition, enable, and constrain practices that again produce and reproduce structures, etc. ad infinitum.

The notion of "digital capitalism" is not automatically superior to any of the concepts just mentioned. They all have in common that they analyse the continuities and discontinuities of contemporary capitalism in a dialectical manner. In the public and academic debate, the notions of digital labour and digital capital have become relatively widely used in the past fifteen years. The notion of the "digital" in the context of critical analysis therefore has gained a dual, dialectical meaning. It is neither just focused on structures, technologies, and objects nor just focused on practices, humans, and subjects. In the context of capitalism, it rather has both a more subjective and a more objective connotation. Therefore, the notion of digital capitalism is suited to ground a critical-dialectical analysis that allows us to understand the dialectics and antagonisms of digital objects and digital subjects, digital capital and digital labour, digital technologies and digital knowledge, etc. (Fuchs 2022a).

Dialectical thought stresses the simultaneous identity and difference of phenomena, which creates tensions that drive development. One important tension in society is the one between the economic and the non-economic. I use the terms capitalism and digital capitalism not just in respect to the economy, i.e., (digital) production, (digital) distribution, and (digital) consumption. Rather, capitalism is a societal totality, a societal formation (*Gesellschafsformation*) where the economic and the non-economic, exploitation and domination, class and identity, etc. stand in dialectical relations. Digital capitalism is the digital dimension of capitalism conceived as a societal formation (Fuchs 2022a).

6.2. Manuel Castells: The Network Society and Informational Capitalism

Manuel Castells is a sociologist whose book *The Rise of the Network Society* (Castells 2010b) is one of the most-read and most-cited works about the Internet and society. In May 2023, it had been cited almost 50,000 times[6].

For Castells, the network society is a society where networks of humans and information networks – such as the Internet – and physical networks through which there are flows of data, commodities, goods, humans, power, money, ideas, and culture "constitute the new social morphology of our societies, and the diffusion of net working logic substantially modifies the operation and outcomes in processes of production, experience, power, and culture" (Castells 2010b, 500)

For Castells, informational capitalism is the economic subsector of the network society. He argues that "the most decisive historical factor accelerating, channeling and shaping the in formation technology paradigm, and inducing its associated social forms, was/is the process of capitalist restructuring undertaken since the 1980s, so that the new techno-economic system can be adequately characterized as *informational capitalism*" (18).

[6] Data source: https://scholar.google.com/, accessed on May 22, 2023.

Castells speaks of informationalism as a new mode of development. “Each mode of development is defined by the element that is fundamental in fostering productivity in the production process” (16). “In the new, informational mode of development the source of productivity lies in the technology of knowledge generation, information processing, and symbol communication. […] what is specific to the informational mode of development is the action of knowledge upon knowledge itself as the main source of productivity […]. Information processing is focused on improving the technology of information processing as a source of productivity, in a virtuous circle of interaction between the knowledge sources of technology and the application of technology to improve knowledge generation and information processing: this is why, rejoining popular fashion, I call this new mode of development informational, constituted by the emergence of a new technological paradigm based on information technology” (17).

For Castells, capitalism is a techno-economic system. In contrast, for Marx, it is a formation of society (*Gesellschaftsformation*) that extends beyond the economy into politics and culture. Castells, therefore, limits the notion of informational capitalism to the economy and sees it as a subdomain of the network society. What he terms *the mode of development* is in Marxist theory often characterised as the technical aspect of the productive forces. But the productive forces also contain labour-power that humans utilise in the production process in order to create new products with the help of the instruments and objects of labour. Castells does not justify why he uses the term “mode of development”. Given his focus on technology when talking about this mode, the term creates the impression that technology determines the development of society.

Constricting the notion of (informational) capitalism to the economy, Castells requires another term for characterising society. He has chosen the notion of the network society. In a nutshell, the notion of “the network society” is troubling because it is uncritical. Everyone associates something positive with the network society. The concept is troubling because it does not trouble anyone. It has functioned as an ideology that has helped to justify capitalism and its inequalities. We do not automatically associate exploitation, inequalities, alienation, power asymmetries, etc. with the term “network society”. But we do have such negative associations when we hear someone talking about “capitalism”.

In the 1990s, there was lots of discussion about the emergence of a global society. The concept of the network society is Castells’ version of globalisation theory. For him, the network society is “a new society” (Castells 2010a, 372). Capitalist society has been undergoing certain deglobalisation tendencies and efforts:

- During the COVID-19 pandemic, the lack of supply of protective gear has led to a certain questioning of global outsourcing.
- The COVID-19 crisis has included a supply chain crisis that has affected the availability of goods such as drugs, furniture, and electrical appliances. As a consequence, economic globalisation has been put into question.
- Russia’s invasion of Ukraine, Putin’s use of oil and gas as weapons, and the increasing political polarisation between China and the USA have led to certain economic deglobalisation and insourcing efforts.
- Neo-Keynesian and socialist politics have put more emphasis on regulating and limiting the power of global capital and capital in general.
- New nationalisms have advocated national capital against global capital.

Given deglobalisation tendencies and efforts, following Castells's logic one would have to again speak of the emergence of a "new society". Why should, however, a "new society" have developed twice within thirty years? Perhaps there is no new society, but just a dynamic evolution of capitalist society where new qualities emerge out of crises.

25 years after its first publication, in a reflection on his book *The Rise of the Network Society*, Castells (2023) admits that he was too techno-optimistic and uncritical about the liberating potentials of the Internet: "I must confess that in this case, the researcher that I fundamentally am was contaminated by the romantic enthusiasm of the libertarian culture of Silicon Valley. […] All future development of the theory must integrate this diversity of uses of technology in a systemic form" (Castells 2023, 942, 943).

Given this insight, it would be a logical consequence for Castells to abandon the network society concept. He does, however, hold on to it and continues to claim that we live in the network society: "The network society is the social structure of our age, the Information Age, as the industrial society was the social structure of the Industrial Age. It is a global social structure, and so it refers to all societies, albeit with extreme cultural and institutional diversity. It does not supersede capitalism. As it was the case with the industrial society, the network society underlies capitalism as well as other possible forms of social organization" (Castells 2023, 941). Castells continues to see capitalism as an attribute of the network society.

The alternative approach suggested in my own work is that capitalism is not a subconcept of another sociological concept but that it is the supra-concept under which other concepts are subsumed. With the rise of the Internet and a new round of globalisation since the 1970s, networking logic has indeed become more important in capitalism. But this does not justify claiming that we live in a "new society" (Castells 2010b, 13, 247, 428, 429, 460). Digital capitalism is old and new at the same time. It preserves class structures and domination by transforming the economy, politics, and culture through the logic of networks and digitalisation.

6.3. Shoshana Zuboff: Surveillance Capitalism

Shoshana Zuboff is a professor of business administration who is known for her work on surveillance and smart machines. In her book *The Age of Surveillance Capitalism*, Zuboff (2019, 7) characterises contemporary societies as "surveillance capitalism", a term whereby she understands a "new economic order that claims human experience as free raw material for hidden commercial practices of extraction, prediction, and sales" and a "parasitic economic logic in which the production of goods and services is subordinated to a new global architecture of behavioral modification". Zuboff assumes there is a dualism of labour and experience: "Instead of labor, surveillance capitalism feeds on every aspect of human experience" (9). "Surveillance capitalism's products and services are not the objects of a value exchange" (10). She speaks of "behavioural surplus" that is independent of labour and argues that surveillance capitalism "births a new species of power that I call *instrumentarianism*. [...] the goal now is to *automate us*" (8). Zuboff argues that "surveillance capitalism is a new actor in history" (14).

Economic surveillance is certainly an important aspect of the capital accumulation model of many transnational digital corporations such as Facebook. Surveillance scandals such as Edward Snowden's revelations and the Cambridge Analytica scandal have shown how surveillance is an important aspect of the interaction of the power of capitalist corporations that belong to the digital industry and state power. But surveillance is not the only and not the primary feature of capitalism and digital capitalism.

There are aspects of digital capitalism that Zuboff does not discuss. For example, the exploitation of information-producing labour and digital labour; the governance of information in the realm of politics; the spread of fake news, post-truth, as well as authoritarian and fascist ideas on the Internet. Surveillance is one of the means to advance exploitation, control/domination, and manipulation/ideology in capitalism, but it is not omnipresent in every aspect of the contemporary digital world.

The notion of digital capitalism better characterises what is going on in contemporary society than the category of surveillance capitalism. Digital capitalism is a still relatively novel dimension of capitalism and capitalist accumulation processes. It is an important topic of research that requires an interdisciplinary critical approach to social research.

Surveillance capitalism is a system, which implies that it cannot be a "new actor". Only humans act. Structures and systems are not human and therefore cannot act. Comparable to Castells, who presents networks as actors, Zuboff says that systems are acting. The overseeing of slaves, Taylorist time and motion studies, etc., were also methods of surveillance used in class societies and capitalism for the extraction of surplus-labour. Surveillance is not new, but part of class societies. But if surveillance has existed in all types of capitalism, then the term "surveillance capitalism" is a pleonasm.

There is a lack of focus on the analysis of digital labour, surplus-value production, and the exchange value of human subjectivity and digital experience in Zuboff's approach. She underestimates the role of labour in capitalism. A capitalism that is independent of labour does not exist. In the social factory, every aspect of human experience has become labour. Capitalism exploits experience, subjectivity, and communication as labour. Surveillance is one of the tools of class society.

Instrumental reason is an aspect of all types of class society. In the *Dialectic of Enlightenment*, Horkheimer and Adorno (2002, 29) point out that in class society reason exists in the form of "instruments of power – language, weapons, and finally machines". In capitalism, such instruments of power include the bourgeois economy, positivism, the capitalist machinery, ideology, and the culture industry. "Reason serves as a universal tool for the fabrication of all other tools [...] Reason's old ambition to be purely an instrument of purposes has finally been fulfilled" (23). In the capitalist economy, there is the instrumentalisation of human labour. The nation-state is a form of political instrumentalisation. It instrumentalises human decision power. Ideology instrumentalises human consciousness. Economic, political, and ideological instrumentalisation is characteristic of class society, not just of what Zuboff terms surveillance capitalism. What is new is that when society becomes a social factory, instrumentalisation reaches wide realms of society and human experience.

Just like Castells cannot make a convincing argument for the claim that we live in a network society, Zuboff's idea that we live in a surveillance society is equally unconvincing. Another term that has been suggested for characterising the role of the digital in society is platform capitalism.

6.4. Nick Srnicek: Platform Capitalism

Nick Srnicek is a researcher who works on the digital economy. He is the author of the book *Platform Capitalism* (Srnicek 2017) where he argues that contemporary capitalism is a platform capitalism.

For Srnicek, platform capitalism is an economy that is based on capital's use of Internet platforms for data extraction: "in the twenty-first century advanced capitalism came to be centred upon extracting and using a particular kind of raw material: data"

(39). “Just like oil, data are a material to be extracted, refined, and used in a variety of ways” (40). Platforms “became an efficient way to monopolise, extract, analyse, and use the increasingly large amounts of data that were being recorded” (42-43). Platforms “extract data from natural processes (weather conditions, crop cycles, etc.), from production processes (assembly lines, continuous flow manufacturing, etc.), and from other businesses and users (web tracking, usage data, etc.). They are an extractive apparatus for data” (48).

Srnicek makes some claims that can be found in neoliberal mouthpieces. In May 2017, *The Economist* (2017) ran a cover story under the title “The World’s Most Valuable Resource is no Longer Oil, but Data”: “A NEW commodity spawns a lucrative, fast-growing industry. […] A century ago, the resource in question was oil. Now similar concerns are being raised by the giants that deal in data, the oil of the digital era”. Google, Amazon, Apple, Facebook, and Microsoft would be “titans” that “look unstoppable”. “The giants’ success has benefited consumers. Few want to live without Google’s search engine, Amazon’s one-day delivery or Facebook’s newsfeed”. “Algorithms can predict when a customer is ready to buy, a jet-engine needs servicing or a person is at risk of a disease”.

Fortune published an interview on big data with Intel’s CEO Brian Krzanich (Gharib 2018). He said: “Oil changed the world in the 1900s. It drove cars, it drove the whole chemical industry. […] Data, I look at it as the new oil. It’s going to change most industries across the board”. Artificial Intelligence-based data is “not just gonna change business, it’s gonna change every person on this planet’s life in some positive way”. “I think if you go and talk to the employees, they’ve never seen the company on this level of pace of change and competitiveness. But I don’t think you can ever stand still and say that it’s fast enough in this technology world”.

To argue that data is the new oil presents technology as a subject that acts (“oil changes, drives cars”, etc., data is “going to change most industries”, AI “changes every person on this planet’s life”). The purpose of this strategy is to reify technological developments as inevitable, unchangeable, unavoidable, and irreversible by presenting them as independent from human will and action. Revolution: Technological developments are presented as revolutionary, as taking place rapidly and as changing everything (“data” as the “new oil”, “data, the oil of the digital era”, “this level of pace of change” is never “fast enough in this technology world”). The problem is that such arguments are a form of digital determinism: Technology is said to be the cause of changes in society (“it’s gonna change every person on this planet’s life in some positive way”). Power structures and social contradictions are disregarded.

Platforms are systems and technological structures. Srnicek’s characterisation of contemporary society as “platform capitalism” where data are of central importance is a structuralist approach that does not include humans and their practices in the main category used for characterising society. While platforms are systems, the notion of the “digital” entails both systems and practices, structures and actions, digital technologies and digital practices, digital capital, and digital labour. Consequently, the words “labour” and “work” do not prominently feature in *Platform Capitalism*. Consequently, Srnicek (2021) also argues that the use of Facebook and Instagram is not productive, value-producing labour. For Srnicek, only wage-labour is productive, which implies that also housework is not productive, whereby he denies a key argument made by Marxist Feminists (Jarrett 2016).

Other than the notion of platform labour, the notion of digital labour allows us to both focus on digital capital and digital labour as well as on digital platforms and digital practices.

The result of the discussion of Castells's notion of the network society, Zuboff's concept of surveillance capitalism, and Srnicek's notion of platform capitalism are that all three do not adequately characterise contemporary society. All three concepts have a narrow concept of capitalism that is limited to the economy. They are structuralist in nature and present systems as actors. They are too technology-centred. In contrast, the notion of digital capitalism as conceived in this paper and related works is based on dialectics of subject/object, capital/labour, economy/society, system/production, structures/practices, etc.

In the next section, we will focus on a forgotten concept in the analysis of digital capitalism: violence.

7. Digital Capitalism and Violence

7.1. Violence and Crises of Global Capitalism

The rise of digital capitalism has occurred in a time of successive and intersecting crises.

The 21st century has so far been a century of many crises. It started with the political crisis following 9/11 that was characterised by a spiral of violence between war and terror. In 2008, a financial crisis hit the capitalist world economy. In many parts of the world, hyper-neoliberalism was the political response. It put in place austerity measures and cuts of social expenditures. Neoliberal capitalism as the dominant form of capitalism has since the 1970s increased inequalities. The result was a social crisis. The hyper-neoliberal responses to the financial crisis intensified the social crisis. The second decade of the 21st century also saw an increase in humanitarian crises as a consequence of wars, natural disasters, climate change, and global inequalities. The escalation and interaction of crises have continuously polarised societies. As a consequence, we have seen the rise and intensification of new nationalisms, authoritarianisms, and fascisms, the spread of post-truth politics, online fake news, online echo chambers, online hatred featuring bullying and death threats, coup attempts, the radicalisation of authoritarianism, the proliferation of the friend/enemy-scheme, and threats to use weapons of mass destruction such as atomic bombs.

The COVID-19 pandemic resulted in multiple interacting crises: a health crisis, an economic crisis, a political crisis, a cultural crisis, a moral crisis, and a global crisis. It further polarised societies politically. A new division between COVID-deniers who opposed lockdowns and held an individualist notion of freedom and those who favoured lockdowns based on a social concept of freedom emerged.

Russia's war of conquest against Ukraine has violated international humanitarian law and has further polarised world politics into opposing camps and a new Cold War. On the one side of this conflict are actors such as the USA, the EU, and the UK. On the other side, there are China and Russia whose leaders present their countries as strategically aligned. The biggest danger is that this conflict escalates into a new world war. Such a war could be a terminal war that results in the use of nuclear bombs. The use of such weapons would destroy humanity and life on Earth. Escalating interacting crises have brought humanity to the brink of its self-destruction, ultimate violence. Violence therefore is the most pressing problem humanity faces today. When theorising and analysing (digital) capitalism we therefore should look at how (digital) capitalism and (digital) violence are related.

The critical theorist Sylvia Walby (2015) argues that the 2008 crisis "was a result of a failure in the governance of finance" (3) and the lack of "democratic control over finance" (161). According to Walby, the crisis cascaded into an economic crisis that

resulted in a global recession, a fiscal crisis of the state that advanced austerity and neoliberalism, and a political crisis where the trust in governments was undermined and there is the danger that the crisis cascades "from a political crisis to a democratic crisis, with political mechanisms no longer able to channel disagreements, thereby leading to violent conflict" (7). She argues that continued neoliberalism is likely to result in an "increase in violence by individuals, protesters and states" (179) while the alternative is the becoming-hegemonic of "a reformed social democracy" that is more likely to prevent wars and reduce violence. What is implicit in Walby's analysis is that the cascading of authoritarian politics and socio-economic inequalities in the world increases the likelihood of a large war, potentially a World War. Such a war could easily mean the end of humanity and the end of life on Earth.

Violence in contemporary digital capitalism has not-yet been adequately understood and theorised. I can here only outline some basic foundations of theorising violence in digital capitalism.

7.2. What is Violence?

Various social thinkers such as Johan Galtung (1990), Pierre Bourdieu (1991), and Slavoj Žižek (2008) argue for an extended concept of violence that goes beyond physical violence. They distinguish between direct, physical violence, structural and systemic violence, cultural-ideological violence, symbolic violence, subjective violence, and objective violence. The feminist social theorist Sylvia Walby is one of the most vocal critics of the extended notion of violence (Walby 2009; Walby and Towers 2017, 2018; Walby et al. 2017). One of her arguments is that the extended notion is inflated and that such an inflation trivialises the physical and sexual violence that many women experience. Broad definitions of violence are often not discernible from notions such as power, domination, and coercion. Notions such as cultural and symbolic violence are often synonymous with the notion of ideology.

Violence is the intentionally caused, intended or threatened physical harm of a human being. Psychological threats to kill or seriously injure someone are preforms of violence. Violence is the ultimate and most brutal form of reification. Reification means power relations where humans are treated like things, reduced to the status of things, and used as instruments. Reification denies and robs humans of their human qualities. Reification is dehumanisation. And dehumanisation opens opportunities for violence.

The French philosopher Simone Weil has drastically pinpointed violence as reification. She says that violence means the turning of human beings "into a thing in the most literal sense: it makes a corpse out of him" (Weil 2005, 183). Violence does not necessarily cause death, but it always causes harm that in intensified form can lead to death. There is violence that aims to hurt the victim and violence that aims at killing victims. There is a difference between damaging violence and deadly violence.

Violence can stem from a variety of motivations, with economic violence being driven by the perpetrators' desire to seize wealth, political violence motivated by the desire to attain or expand political power, and cultural violence driven by the perpetrators' worldviews, identities, and ideologies. In cases of everyday violence, these categories can intersect, resulting in multiple motivations and interests contributing to acts of violence.

Violence involves an actor as the perpetrator and another actor who is the victim of violence. Violence, therefore, is a social relation. There are three basic types of actors: an individual, a social system (social group, organisation, institution), or a whole society. There are ten varieties of violence depending on who the perpetrator is and who the victim is:

1) an individual's violent attack on themselves (suicide, self-harm);
2) an individual's violent attack on another individual;
3) an individual's violent attack on a social system;
4) an individual's violent attack on a society;
5) a social system's violent attack on an individual;
6) a social system's violent attack on another social system;
7) a social system's violent attack on a society;
8) a society's violent attack on an individual;
9) a society's violent attack on a social system;
10) a society's violent attack on another society.

7.3. Violence in Capitalism

Slavery and feudalism are modes of production that are based on violence as a major means the dominant class uses for exploiting and oppressing the working class. The slave is the private property of the slave-owner, which means absolute dehumanisation and the reduction of humans to the status of things. The slave-owners can kill the slave without facing legal consequences. Slave-owners are legally allowed to treat slaves like things, which enables extreme exploitation of their labour.

The formation of capitalism was based on what Marx terms primitive accumulation, the use of "blood and fire" (Marx 1867/1990, 875) for creating capitalist means of production and wage-labour. Violence was used for driving small property owners from their land, turning common land into private property, and creating wage-labour. Violence was also used as part of colonialism that robbed resources and humans from the Global South in order to create means of production that enabled the formation and development of capitalism. Capital and capitalism come into existence "dripping from head to toe, from every pore, with blood and dirt" (Marx 1867/1990, 926). It is a mistake to assume that violence is a necessary means for a revolution. Non-violent revolutions such as, for example, the anti-colonial revolution in India that resulted in India's independence from the British Empire and the 1989 revolutions in Eastern Europe that brought about the end of the Soviet Union show that there are also non-violent revolutions and transitions. Marx's (1867/1990, 916) formulation that violence "is the midwife of every old society which is pregnant with a new one" should therefore not be interpreted as an absolute statement that applies to every revolution.

The creation of wage-labour was based on a shift from violence to structural coercion and management as means of control. The formal use of violence was legally shifted to the nation-state that obtained a formal legal monopoly over the means of violence. Informal use of violence continued to exist both inside and outside of the economy. Coercion describes the use of means or the threat to use means that force humans to behave in certain manners that others define. Violence is one form of coercion. In capitalism, one major form of coercion is the "silent compulsion of economic relations" (Marx 1867/1990, 899). Workers in capitalism legally own themselves, their bodies and their minds. Coercion is institutionalised in labour markets and commodity markets that together compel humans to work for the capitalist class so that they obtain money that they need in order to buy commodities as means of subsistence so that they can survive.

The question is raised whether famine and poverty in poor countries can be considered violence, given that violence typically involves actors who inflict harm on victims. Global capitalism is a societal system that is dependent on human practices and is composed of various structures, such as markets, nation-states, and ideologies. Poverty has complex causes and is a result of a global class system that creates power

relations between the rich and the poor. Those who support a possessive-individualist concept of freedom consider poverty and strong wealth inequalities as intentional and rational features of society, rather than a result of unintentional circumstances. Therefore, the class system's violence is intentional, as it upholds an ideology that values the freedom of individuals to become wealthy without limits, which leads to economic violence and creates poverty intentionally. The actor causing famine is in the last instance the global class of the rich and those governments, parties, and politicians that uphold and justify a class system that denies humans the necessities of life including healthy food, drinking water, shelter, health care, etc.

Violence has not ceased to exist in capitalism, which is why authors such as Rosa Luxemburg (1913/2003) and Maria Mies (1986) speak of ongoing primitive accumulation in capitalist society. Paraphrasing Marx's (1867/1990, 926) insight that capitalism emerged from "blood and dirt", Luxemburg (Luxemburg 1913/2003, 433) writes: "'Sweating blood and filth with every pore from head to toe' characterises not only the birth of capital but also its progress in the world at every step, and thus capitalism prepares its own downfall under ever more violent contortions and convulsions". This means that primitive accumulation is for Luxemburg not just the origin of capitalism but an ongoing capitalist process.

Ongoing primitive accumulation involves warfare used for the conquest of territories that are spheres of accumulation and political influence and commodity markets, the continued existence of slavery; the use of violence for the exploitation of the unpaid or low-paid labour of houseworkers, illegal migrants, slaves, and precarious workers; wars of conquest that aim at the control of spheres of political, economic and ideological influence; and the use of violence for the robbery, dispossession, and expropriation of natural and social resources that are turned into capitalist means of production. Expropriation turns resources such as labour-power, land, nature, the body, organs, etc. into capitalist means of production by other means than the wage-labour-market. It works by "confiscating human capacities and natural resources and conscripting them into the circuits of capital expansion. The confiscation may be blatant and violent, as in New World slavery; or it may be veiled by a cloak of commerce, as in the predatory loans and debt foreclosures of the present era" (Fraser 2022, 34).

Luxemburg (1913/2003, 432) stresses that war is a particularly important means of ongoing primitive accumulation: "The other aspect of the accumulation of capital concerns the relations between capitalism and the non-capitalist modes of production which start making their appearance on the international stage. Its predominant methods are colonial policy, an international loan system – a policy of spheres of interest – and war. Force, fraud, oppression, looting are openly displayed without any attempt at concealment, and it requires an effort to discover within this tangle of political violence and contests of power the stern laws of the economic process".

Capitalist world society has resulted in two World Wars that were wars about the global control of economic resources, political power, and influence as well as numerous other wars. In capitalist society, the potential for wars and World Wars arises from capitalism's competitive structures that are built into the logic of accumulation so that individuals, groups, classes, and states compete for the control of economic, political, and cultural power. The control of land and economic property plays a particularly important role in this context. The formation of the modern nation-state has been associated with the formation of state apparatuses that hold a legal monopoly of violence, especially armies, the police, the criminal justice system (that in a significant number of nation-states uses the death penalty), and secret services. Armies are set up and there is armament so that nation-states have means of destruction and violence at

their disposal for the defence of their political and economic resources bounded within the nation-state. In modern nation-states, violence is institutionalised in coercive state apparatuses. This has also led to the capitalist arms industry that produces means of destruction that are sold to accumulate capital. The arms industry's capital is a capital of violence and death, it is capital that is set to kill and destroy, to produce death.

The globalisation of capitalism and the rise of neoliberalism since the 1970s have also advanced the violent dispossession of resources from the world's poor and the use of violence as means of management and control in Fordist manufacturing factories such as Foxconn where commodities are produced that are sold on the world market. Global neoliberal capitalism has resulted in precarious forms of labour that are unprotected and insecure, which exposes such workers to the capitalist use of violence as means of management and violence that makes them produce more surplus-value in less time. Housewifisation means that many workers have turned into precarious workers in neoliberal capitalism and face unfree working conditions that have been characteristic of houseworkers for a long time (Mies 1986). As a consequence, such workers are prone to having to take on labour where violence is used as a means of management.

Where there is class, there is inequality. Given socio-economic inequality and antagonistic societal structures, there is a certain level of violent crime and violent property crime. Class structures make some rich while depriving others. They make some happy and others isolated, unhappy, aggressive, and violent. Class societies are violent societies.

Violence is also an ideology. Moral panics are public ideological campaigns against certain groups that are presented as a social problem, dangerous, and violent. Tabloid media and racism have played a particular role in constructing scapegoats as part of moral panics. Violence as ideology distracts from the actual complex causes of social problems that are grounded in the antagonisms of capitalist society.

Capitalism's economic cell form is the commodity. The capitalist economy is an immense production of commodities that are sold in order to advance the accumulation of money-capital. Commodities and money-capital are the two main economic structures of capitalist society. In order to accumulate money-capital, power, and hegemony, capitalism requires the reproduction of class relations and relations of domination. In such relations, humans are treated like things, they are turned into instruments that serve the purpose of accumulation. They are reified. Capitalism is an instrumental system of reification. The social relations that humans constitute disappear behind the dominance of things and structures such as commodities, money, the state, and ideology. Marx (1867/1990, chapter 1: section 4) spoke in this context of the fetishism of the commodity.

In capitalist society, fetishism is not restricted to the economy, but extends into the totality of society. The capitalist state instrumentalises citizens. Ideology instrumentalises the human mind. Capitalism is not just a system of accumulation, but a system of accumulation that uses various forms of instrumentalization as societal means of production and societal means of accumulation. In capitalism, humans must in class relations and relations of dominated be treated as things in order to make accumulation possible. There are both violent and non-violent forms of reification. Dominant groups resort to violence as means because they are ideologically convinced it is the best means to use or they think violence as means of accumulation is more efficient and effective than non-violent means. In capitalist society, we have therefore again and again seen the use of violent means, including warfare and slavery, as means of accumulation. Other media/means of accumulation include, for example, economic

means such as markets, political means such as laws and contracts, and cultural means such as ideology. The state is an institutionalised form of politics that monopolises the legally justified use of violence. In some cases, state power is direct violence, as in the case of police violence, military action, and the death penalty. In other cases, where laws that do not results in physical harm are applied and executed, the state legislates in a non-violent manner that is based on and founded on the state as the institutionalised monopoly of the use of violence. Ideology similarly has a complex relation to violence. Ideology is not violence itself. But certain ideologies, including anti-Semitism, racism, and fascism, construct particular groups as enemies who are blamed for society's problems and whose extermination is suggested, promoted, and legitimated. The communication of violence, such as the call for the use of violence, can turn into actual violence that in turn may result in the communication of violence in the form of the ideological legitimation of violence.

The critical theorist Moishe Postone stresses that fetishism is deeply built into capitalist society: "*The structure of alienated social relations which characterize capitalism has the form of a quasi-natural antinomy in which the social and historical do not appear*" (Postone 1980, 109). The naturalisation of things as natural, necessary, and eternal is built into the structures of capitalism. When social relations and human practices disappear behind things, voids are created that make the causes of society's problems untransparent. When class relations and structures domination appear as natural, it is not immediately evident what the causes are of poverty, overwork, deindustrialisation, unemployment, social and economic crises, inflation, natural disasters, etc. This void is often filled by artificial, fictive, illusionary stories that invent causes of society's problems. The result are ideologies that declare that certain groups or individuals, such as the poor, the unemployed, migrants, Jews, minority groups, etc. are the cause of these problems. The fetish structure of capitalism leads to the creation of ideology that often contains the communication of violence that can turn into actual violence in the form of genocide, pogroms, terror, industrial mass murder, etc. Violence has its material foundation in the fetish structure of capital and capitalism that in turn is the consequence of the logic of instrumentalization and reification.

There lies a danger in interpreting history as developing independent of human collective practices. Such assumptions underestimate the dialectic of structural conditions and political action, or, as Marx (1852, 103) says, that humans "make their own history, but they do not make it as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past". Such an underestimation can be found in Hegel's concept of history.

Hegel says that spirit is freedom, the lack of external dependence of humans, "self-sufficient being" (Hegel 1998, 20), When Hegel says that "freedom is the only truth of Spirit" (Hegel 1998, 20), then a sympathetic reading can interpret him as saying that humans have the capacity and a certain desire for freedom so that in history there have again and again been struggles for freedom. Hegel, however, in his idealist fetishization of spirit that underestimates the importance and relative openness of social struggles, goes further and formulates a functionalist concept of history that is also known as what he terms "the *Cunning of Reason*" (35). He thereby means that in history, besides all catastrophes and setbacks, there is the necessary progress of freedom. "World history is the progress in the consciousness of freedom – a progress that we must come to know in its necessity" (32). Hegel not just says that humans throughout history become more conscious of freedom but also that they realise ever more freedom: "World history, as we saw, presents the development of consciousness, the

development of Spirit's consciousness of its freedom, and the actualization that is produced by that consciousness. This development entails a gradual process, a series of further determinations of freedom, that arise from the concept of world history" (67).

Given that for Hegel there is through and despite setbacks a long-time automatism of freedom in history, he sees violence, warfare, and misery as necessary sacrifices that humans have to make in order to advance freedom, which why is he speaks of the "altar of the earth": "It is this final goal – freedom – toward which all the world's history has been working. It is this goal to which all the sacrifices have been brought upon the broad altar of the earth in the long flow of time" (22).

The problem of such a concept of history is that it encourages humans to see catastrophes, violence, war, genocides, industrial mass murder, etc. as inevitable and long-term signs of progress that can and should not be resisted. Resistance to Auschwitz is in such a view discouraged. Theodor W. Adorno (2004) rejects such a deterministic and functionalist concept of history. He stresses that the reality of history is that class societies have produced means of destruction and annihilation: "Universal history must be construed and denied. After the catastrophes that have happened, and in view of the catastrophes to come, it would be cynical to say that a plan for a better world is manifested in history and unites it. […] No universal history leads from savagery to humanitarianism, but there is one leading from the slingshot to the megaton bomb" (Adorno 2004, 320). Given that history and capitalism's negative dialectic have resulted in Auschwitz, Adorno formulates a New Categorical Imperative: "A new categorical imperative has been imposed by Hitler upon unfree mankind: to arrange their thoughts and actions so that Auschwitz will not repeat itself, so that nothing similar will happen" (Adorno 2004, 365). In the light of fascism, anti-fascist praxis is of highest importance.

Formulated in a different way, Marx reminds us that history and structures do not act and that only humans make history, which implies that history is relatively open: "*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). Humans act collectively in politics and at certain moments change the course of history. Given the importance of human praxis, history is not determined, but relatively open, which also implies that war, annihilation, mass murder, genocide, and violence in general are not inevitable, but avoidable. They are not necessary features of humanity and society.

7.4. How can Violence and War be Limited?

At the international level, institutions have been established that aim at limiting the use of violence and war as means of politics by fostering political communication. After the experience of two world wars, the United Nations was founded in 1945 with the defined goals to "maintain international peace and security", "develop friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, and to take other appropriate measures to strengthen universal peace", "achieve international co-operation" (United Nations Charter, article 1, https://www.un.org/en/about-us/un-charter/chapter-1). There were 51 founding members of the UN. In 2023, it grew to 193 member states.

The Chinese philosopher Tingyang Zhao (2016) is critical of both Kant's concept of perpetual peace and Habermas' discourse ethics (chapter 16). He argues that Kant's idea of a confederation of free, democratic states might be able to prevent war among democratic states but has problems preventing wars and conflicts between such states

and others. Habermas argues that international conflicts can be solved by "modes of dialogue that are fully rational and entered into under conditions of full equality, sincerity, and honesty" (196). Zhao argues that with "respect to those things that involve our most fundamental interests, it doesn't matter how rational the dialogues that we engage in because none of them can lead to effective conflict resolution" and that "mutual understanding cannot guarantee mutual agreement" (197). The United Nations would stand in this Kantian tradition. The discourses it organises for overcoming conflicts would be based on "dialogue and mediation" that "can to some degree help to diminish warfare, but these methods alone have never been able to decrease the contradictions that give rise to reasons for conflict in the first place" (199). The "UN is ultimately an organization lacking in effective power on a global scale" (199).

It is certainly important to stress that communication and discourse alone do not solve all political-economic conflicts. Rather, when there are fundamental disagreements over the control of territory, economic value, political power, and worldviews, words that do not come along or result in the redistribution of resources can easily fail as means of conflict resolution. Diplomacy, however, as discursive means does not stand outside of the redistribution of material resources. Zhao underestimates the importance of communication. For example, in peace negotiations in a war discourse is used as the means for trying to agree on how strategic resources are distributed in a manner so that all involved conflict parties agree to a compromise or solution that they find acceptable and makes them put down their weapons. In addition, means of communication such as the Internet are themselves material resources, as Zhao stresses himself, that are part of questions of war and peace. Think, for example, of cyberwar, cyberespionage, and fake news as means of trying to manipulate elections, ideology online, etc. Means of communication do not stand outside but are part of political-economic relations.

Stephen C. Angle (2012) agrees with Zhao (2016) that an international system is needed that helps to advance universal benefits, advantages for everyone, and universal compatibility where all humans and societies can co-exist. But he rejects dismantling "the existing institutions" of international politics, especially the United Nations, and to "start from scratch" (79). It would not be possible to create global universal institutions out of nothing. "While the United Nations, the Universal Declaration of Human Rights (UDHR), and the many human rights treaties that have been negotiated since the Second World War are not perfect, they do collectively represent the kind of process that a concern for all-under-heaven would demand" (89). As imperfect and volatile as the UN is, it is the best starting point for building an international peaceful and universally beneficial order. Such an order requires a political economy that is built on the principles of international co-operation and mutual benefits.

Walby (2009) shows that an increase in inequalities tends to increase violence. She summarises her insights: "Those countries that are more unequal and less democratic, the more neoliberal countries, have higher rates of violence of all forms – from interpersonal to the criminal justice system to the military – than do those countries that are less unequal, more fully democratic, and more likely to be social democratic" (217). "There are higher levels of violence in neoliberal countries than in social democratic ones" (192). "Democracy provides important limits to war. Democracy is linked to the extent of use of military force; military power is used less in a mature democracy than in other regimes; mature democracies rarely if ever initiate wars against each other […]. This may be because of the nature of political culture in a democracy […]. Further, democracies can provide routes by which those whose lives are put at risk by military engagement can find a political voice and effective resistance. These processes can

link domestic and external politics. An increase in the proportion of regimes that are democratic should thus be associated with a decrease in violent warfare" (206-207).

Walby (2009) analysed statistical data on the connection between the prevalence of violence in society and socio-economic and political factors. For measuring violence, she used indicators such as the homicide rate per 100,000 population, the number of prisoners per 100,000 population, or the government expenditure on law and order and the military as percentages of GDP (see table 8.8 on page 298 in Walby 2009). We can summarise the main, very insightful and illuminating findings of Walby's empirical analysis of violence in society:

> "the homicide rate is higher in poorer, less developed countries than in richer countries. […] There is a positive correlation between homicide and the level of economic inequality as measured by Gini […] There is a higher rate of homicide in countries that are more economically unequal" (298-299).
>
> "There is a striking set of correlations between the various aspects of violence […] There is a cluster of phenomena of violence: homicide, prisoners, death penalty, expenditure on law and order and expenditure on the military. If any one of these is higher in a country, then it is likely that the others will be also" (300).
>
> "The higher the level of economic inequality, the more likely a country is to have higher rates of imprisonment and higher levels of military expenditure as a percentage of GDP" (300-301).

Walby shows empirically that (in)equality and the (lack of) democracy influence the levels of violence (311). "Countries that are less equal and less democratic have higher rates of violence; these are characteristics of neoliberal rather than social democratic countries" (311).

One implication of Walby's analysis is that the increase in inequalities, neoliberalism, authoritarianism, and fascism tend to increase violence and the risk of war. In situations of a social crisis, fascists and authoritarians coming to power or deepening their power pose the risks for the escalation of conflict into wars.

7.5. Digital Violence

The rise of digital technologies and digital capitalism partly stands in the context of warfare. New digital technologies, including the computer and the World Wide Web, have often originated in a military context (Merrin 2019, 46). Digitalisation has contributed to the constant development and sustained profitability of the arms industry. Weapons are not just tools that are situated in contexts where they are used for attacks that aim to kill, harm, destroy, and injure humans. In capitalism, they are also industrially produced commodities that yield profits.

In the Second World War, computers were used for the encryption and deciphering of messages and radar was used as a technology for location, detection, and tracking. Warfare has been one of the factors that have advanced the development of computer technologies. Ever since the Second World War, computing has played an important role in warfare in the form of cyberwarfare, digital surveillance, digital reconnaissance, digital communication in the context of command and control, smart weapons, and public communication.

There are three forms of digital communication and digital mediation in the context of violence: the digital communication of violence, the digital communication about violence, and the digital mediation of violence.

7.6. The Digital Communication of Violence

With respect to the *digital communication of violence*, the crises of capitalism have polarised politics, which has advanced the digital communication of violence, which includes the proliferation of online threats of violence and killings. Such threats are frequently communicated anonymously. Discursive dispute settling fails in such instances. With the intensification and extension of polarisation, nationalism, and fascism in (digital) capitalism, the digital communication of violence has proliferated. Especially far-right individuals, groups, politicians, and parties see violence as an appropriate means of conflict resolution. Their ideology is based on nationalism, the friend/enemy-scheme, and militarism. Therefore, the expansion of digital fascism has resulted in the advancement of the digital communication of violence.

We can define fascism as an anti-democratic, anti-socialist, and terrorist ideology, practice, and mode of organisation. It is based on the combination of several principles: (a) the leadership principle, (b) nationalism, (c) the friend/enemy scheme, and (d) militant patriarchy, which involves idealising soldiers, practising patriarchy, subordinating women, and using war, violence, and terror as political means. Fascism utilises terror against perceived enemies and aims to establish a fascist society by institutionalising these principles. It seeks to mobilise individuals who fear losing property, status, power, and reputation due to societal conflicts. Moreover, fascism plays an ideological role in capitalist and class societies by attributing society's problems to scapegoats, framing them as conflicts between the nation and foreigners or enemies. This diversionary tactic draws attention away from the systemic roles of class and capitalism and the inherent contradiction between capital and labour in societal issues. Fascism often propagates a one-dimensional, one-sided, and personalising "anti-capitalism" that constructs the nation as a political fetish and an antagonism between the unity of a nation's capital and labour on the one side and a particular form of capital or economy or production or community on the other side that is presented as destroying the nation's economic, political, and cultural survival.

7.7. Digital Fascism and Violence

Digital fascism means fascists' digital communication of violence, digital communication about violence, and the digital mediation of violence and war for fascist purposes. Fascism is a particular and terrorist form of right-wing authoritarianism that aims at killing identified enemies using violence, terror, and war.

Digital fascism means that fascists utilise digital technologies such as computers, the Internet, mobile phones, apps, and social media in order to (a) communicate internally so that they co-ordinate the organisation of fascist practices and (b) communicate to the public the leadership principle, nationalism, applications of the friend/enemy-scheme, and threats of violence as well as the propagation of violence, militarism, terror, war, law-and-order politics, and extermination directed against the constructed enemies and scapegoats in order to try to find followers, mobilise supporters, and terrorise constructed enemies.

In digital fascism, fascists use digital technologies for trying to advance violence, terror, and war as means for the establishment of a fascist society. Ideology constructs scapegoats and agitates them online, including socialists and immigrants. The

scapegoats that fascist ideology constructs and against whom it agitates online include immigrants, socialists, liberals, intellectuals, experts, and democrats.

The critical theorist Erich Fromm (1973) argues that fascism has to do with what he terms necrophilia, the fascination with death and the desire to destroy and try to resolve conflicts by violence. Necrophilia is "*the passionate attraction to all that is dead, decayed, putrid, sickly; it is the passion to transform that which is alive into something unalive; to destroy for the sake of destruction; the exclusive interest in all that is purely mechanical. It* is *the passion to tear apart living structures*" (Fromm 1973, 332).

Necrophilia is also but not exclusively a feature of the character structure of authoritarian and fascist individuals. It is an important aspect and characteristic of fascist groups, fascist organisations, fascist institutions, and fascist societies. Fascists believe in the use of violence and war as common means for conducting politics. The more fascism proliferates in society, the more likely war becomes. "Militarization and war are associated with the absence of an effective democracy" because in fascist regimes and other dictatorships, "young men and their associates" (Walby 2009, 207) are less likely to resist conscription and civil society has more difficulties resisting the government's war-efforts. Higher levels of social inequality tend to reduce "the capacity for resistance to war" (Walby 2009, 207). A higher level of poor people makes it more likely that the state succeeds in recruiting poor people into the army by promising to support education and providing a sustainable income.

In the digital age, this means that when fascism proliferates, also digital fascism proliferates. Fascists use a variety of means, including computing, information and communication technologies, for trying to attain their goals. In a society that is shaped by digital technologies, they will therefore make use of digital means for trying to put necrophiliac politics into practice. They will strive to threaten their identified enemies online and develop digital weapons in order to harm and kill those whom they see as enemies. Fascists in the digital age practice the friend/enemy-scheme in many spaces and with many means, including digital spaces and digital technologies.

7.8. The Digital Communication about Violence

The digital communication about violence means that cultural workers produce digital content that represents violence and is communicated to the public who consume and interpret such content. When violence increases in society, the question arises of how journalists should report on violence. There is a difference between the reporting on violence as a spectacle and the reporting on violence in a contextual, dialectical manner that situates violence in society's antagonisms and the lived experiences of these antagonisms.

There is a variety of representations of violence in the media, such as, for example, violence in movies (horror movies, thrillers, crime movies), violence in music lyrics (death metal, gangster rap), violence against women in pornographic movies, violence in computer games, news reporting on violence and war, etc. One question that arises, again and again, is what impacts representations of violence have on individuals and society. One argument is that the representation of violence in the media and on the Internet causes violence. This is a media-centric and techno-deterministic argument that overemphasises the roles of media and technology in the relationship between media technologies and society. There is also the danger that the argument that the media make individuals, including children and teenagers, violent become part of moral panics that more reflect the fears of adults about their children than actual reality. Another argument is that media representations of violence do not have any effects on individuals and society. This is a relativist argument that denies that culture has some

relevance in society. A third argument is that violence is rooted in society's antagonisms and that the likelihood that individuals and groups who because of their experiences in society's antagonistic structures are prone to be violent might be increased by their frequent consumption of media representations of violence.

7.9. The Digital Mediation of Violence and Digital Warfare

In the *digital mediation of violence*, the perpetrator utilises a digital weapon (system) for trying to kill or damage the health of the victim(s). Both the perpetrator and the victim(s) can be individuals, social systems, or societies. A digital weapon is a digital technology that is used for carrying out attacks that should lead to the killing of human victims or damage to their health.

War is organised, large-scale violence between at least two politically organised groups where at least one group sees the other group as an enemy that should be annihilated in order to realise a particular political interest against the will of this identified enemy. Digital warfare is a particular type of digital mediation of violence. Information warfare means that parties involved in wars produce and circulate information about enemies and in some cases themselves in the context of war. Digital warfare means that digital technologies are utilised in the context of warfare. In digital warfare, there is large-scale violence between at least two politically organised groups where at least one group sees the other group as an enemy that should be annihilated in order to realise a particular political interest against the will of this identified enemy and at least one side uses a digital weapon (system) for trying to kill and damage the health of the members of the other side.

The digital mediation of warfare has resulted in automation tendencies of warfare. The results have been military drones and investments in the development of autonomous weapon systems. Two of the world's most powerful armies, the US and the Chinese military, are heavily investing in AI and robotics in order to create "smart", autonomous weapon systems. At the same time, world politics has become more polarised. It might very well be that autonomous weapons will be used in future wars. The utilisation of such weapons might make such wars and conflicts even more brutal and inhumane. The drive towards the automation of warfare has to do with fears of armies losing soldiers and the interest to minimise an army's risks while maximising its destructive power.

The world has due to escalating crises experienced political polarisation. At the international level, the danger of a new world war has massively increased. A new Cold War has emerged. The major players in this conflict, especially the USA, China, Russia, the EU, and the UK, are heavily investing in armament. The Russian invasion of Ukraine has fuelled the new Cold War, political polarisation, and a new arms race.

In 2021, the world military expenditure stood at a level of US$ 2.08 trillion and for the first time exceeded US$ 2 trillion (source of all data in this paragraph: World Bank Data, https://data.worldbank.org/, accessed on March 24, 2023). Measured in terms of its share of the global GDP, world military expenditure from a height of 6.3 percent of the global GDP in 1962 dropped to 3.0 percent in 1990 after the end of the Cold War and in 2021 stood at 2.2 percent. In 1962, with the Cuban Missile Crisis, the Cold War reached a peak where a nuclear war could have broken out. Given the increasing polarisation of world politics in the 21st century where we find a strategic alliance of China and Russia on the one side and NATO on the other side, more and more observers have argued that a new Cold War has developed or is about to develop. If a New Cold War indeed unfolds, the share of military expenditure in the global GDP is likely to increase.

In 2021, the USA, China, India, the United Kingdom, and Russia accounted for the highest share of world military expenditure. Together their military budgets made up 62,8 percent of the world's military expenditure. The USA's share was 38.5%, China's 14.1%, India's 3.7%, the UK's 3.3%, and Russia's 3,2% (data source: World Bank Data, https://data.worldbank.org/, accessed on March 24, 2023). Figure 1 shows the development of these five countries' shares in world military expenditure.

The USA has continuously held the largest share of world military expenditures. Since the end of the Cold War, this share has decreased. The most significant development is the rise of China's share from 1.4 percent in 1990 to 14.1 percent in 2021. China is not just the USA's main economic competitor but has also tried to catch up with the USA in the development of its military capabilities.

Russia's invasion of Ukraine in 2022 has impacted world military spending. In 2022, world military expenditure increased by 6.3 percent and stood at US$2.2 trillion (data source: Military Expenditure in Current US$, World Bank Data, https://data.worldbank.org/, accessed on February 7, 2024), which was 2.2 percent of the global GDP (data source: World GDP in Current US$, World Bank Data, https://data.worldbank.org/, accessed on February 7, 2024). Russia's share of global military expenditure increased from 3.2 percent in 2021 to 3.9 percent in 2022, Ukraine's share from 0.3 percent to 2.0 percent (data source: Military Expenditure in Current US$, World Bank Data, https://data.worldbank.org/, accessed on February 7, 2024). Military escalation of a political conflict has resulted in massive armament.

The new arms race is also a digital arms race. It is unlikely although not impossible that in a highly polarised political world treaties are negotiated that limit the development of new (digital) weapons of mass destruction. If political polarisation continues, then it is very likely that also the investment into and development of robot soldiers used in hybrid armies and autonomous weapon systems that automatically select targets and kill autonomously from human command and control will continue. Future digital weapons are likely to make war more ruthless and brutal. Robots and AI systems do not have morals, doubts, feelings, fears, and empathy. They can be programmed to kill remorselessly. Given the polarisation and escalation of conflicts into wars, it is likely that war-fighting parties choose to develop such systems that kill massively and ruthlessly because they want to utilise and develop any means necessary for winning. Warfare has become more spatially distanced so soldiers today often operate from a distance using semi-automatic weapons systems such as combat drones. For example, in the war in Ukraine, Russia has used Iranian Shahed drones where the target is first selected and programmed by humans and the "kamikaze drone" flies and attacks automatically using GPS.

The more nationalist and fascist authoritarian countries become, and the more fascist leaders of powerful nations emerge, the more likely a large war along with an escalating digital and nuclear arms race that might end humanity becomes. Fascists and authoritarians consider violence and war as appropriate means of politics. When political polarisation reaches a bifurcation point, they are likely to go to war. The proliferation of fascism and authoritarianism in the world is likely to advance (digital) wars and the development of digital weapons that maximise causalities and destruction.

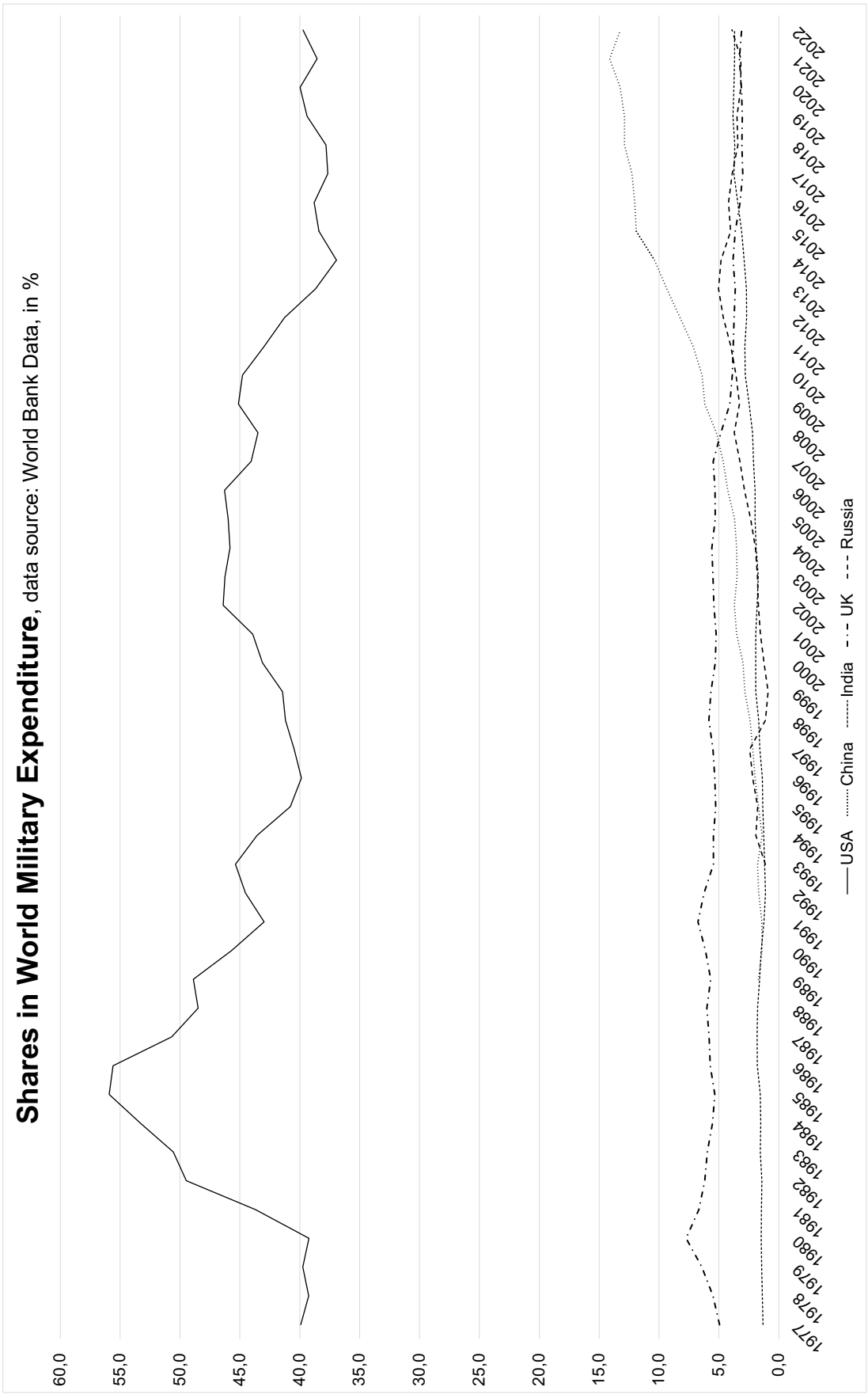

Figure 1: The development of five countries' shares in world military expenditure

8. Conclusion

This paper asked: What is digital capitalism? We want to now summarise the main findings:

- **Capitalism:**
  Influential scholars such as Joseph Schumpeter, Werner Sombart, Thorstein Veblen, and Max Weber theorise capitalism as an economic system. In contrast, in classical critical theory, Karl Marx and in contemporary critical theory authors such as Nancy Fraser argue that capitalism is more than an economy. For Marx, capitalism is a formation of society (*Gesellschaftsformation*).
- **Theorising digital capitalism:**
  A critical theory of digital capitalism should conceive of digital capitalism as the digital dimension of capitalism as formation of society. Digital capitalism does not just have economic aspects, but also non-economic aspects that interact with and are based on class structures and class relations. Digital capitalism is the dimension of capitalist society where processes of the accumulation of capital, decision-power, and reputation are mediated by and organised with the help of digital technologies and where economic, political, and cultural processes result in digital goods and digital structures. Digital capitalism is an antagonistic dimension of society, a dimension that represents how economic class antagonism and social relations of domination are shaped by and shape digitalisation. For theorising digital capitalism, we can learn from Nancy Fraser that it is important how we look at the dialectics of the economic and the non-economic within the capitalist formation of society when analysing digitalisation.
- **Digital capitalism and other concepts of society:**
  Concepts such as the network society, surveillance capitalism, and platform society do not adequately understand the relationship between capitalism and digitalisation. They have a narrow concept of capitalism that is limited to the economy. They are structuralist in nature and present systems as actors. They are too technology-centred. In contrast, the notion of digital capitalism as conceived in this paper and related works is based on dialectics of subject/object, capital/labour, economy/society, system/production, structures/practices, etc.
- **Digital capitalism – more than just an economy:**
  In the study of digital capitalism, many approaches understand digital capitalism merely as an economic system. Class and class transformations are key features of digital capitalism. The accumulation logic of the digital capitalist economy shapes digital capitalist politics and digital capitalist culture that have their own specific emergent qualities and relative autonomy. Capitalism is, as we can learn from Nancy Fraser, more than an economy. Digital capitalism is more than a digital economy.
- **Violence and war in digital capitalism:**
  We live in violent times. The relationship between digital capitalism and violence has thus far not been enough theorised and analysed. Violence is the intentionally caused, intended or threatened physical harm of a human being. Violence plays a variety of roles in capitalism. Most significantly, capitalism has resulted in two devastating World Wars. War is organised, large-scale violence between at least two politically organised groups where at least one group sees the other group as an enemy that should be annihilated in order to realise a particular political interest against the will of this identified enemy. In digital capitalism, aspects of violence include, for example, digital violence, digital warfare, the digital communication of

violence, the digital communication about violence, and the digital mediation of violence, and digital fascism.

8.1. Ten Onto-Epistemological Premises for the Critical Analysis of Digital Capitalism

I want to close this paper with 10 premises that see as important onto-epistemological foundations of critical theories of digital capitalism.

Premise 1:

The category of digital capitalism competes with various concepts from information society theory and must position itself in relation to them.

Premise 2:

A theory of digital capitalism must answer the question of the continuity and discontinuity of society's development in the context of digitalisation. In doing so, it is suggested that the assumption of a dialectic of continuity and discontinuity is helpful.

Premise 3:

A theory of digital capitalism must ask itself the question of how informatisation and digitalisation are related to agriculture and manufacturing. The approach presented in this paper proposes to assume not a replacement but a dialectical sublation (*Aufhebung*).

Premise 4:

A theory of digital capitalism must answer what digitalisation and informatisation mean for both subjects and objects. Some concepts of society prefer the subject level, others the object level. In order not to absolutise either the one or the other level, it makes sense to start from a dialectic of digital subjects and digital objects, i.e. a dialectic of knowledge production and knowledge structures as well as knowledge work and information technologies.

Premise 5:

A theory of digital capitalism must also ask itself how new digital capitalism is. I propose that today we are dealing simultaneously with a digital society and a digital capitalism in the form of a dialectic of digital productive forces and digital, networked relations of production that operates not only in the economy but in society as a whole.

Premise 6:

Theories of digital capitalism must build on definitions and theories of capitalism, i.e. address the question: What is capitalism? In this context, capitalism can be understood either as a pure economic form or as culture or as a formation of society. The application of Marx's understanding of capitalism has the merit that digital capitalism can be understood as an aspect of capitalism as a formation of society.

Premise 7:

If capitalism is not just an economic order but a formation of society, then the analysis of capitalism is the analysis of economic exploitation and non-economic domination phenomena as well as their interaction. Theories of digital capitalism should also address the question of how class, racism, and patriarchy are related in the context of digitalisation.

Premise 8:

Concepts of digital capitalism are related to related terms such as surveillance capitalism, platform capitalism, data capitalism, big data capitalism, cognitive capitalism, high-tech capitalism, cultural capitalism, consumer capitalism, etc. Such terms often emphasise specific aspects of digitalisation in capitalist society, such as surveillance, big data, algorithms, knowledge production, digital culture industry, digital consumption of goods, etc., as well as their implications and effects. Theories of digital capitalism

should address the question of how they relate to and position themselves in relation to other concepts of capitalism.

Premise 9:

Digital capitalism is a dimension of the capitalist formation of society. One should not absolutise digital capitalism in social analysis but examine its interactions and entanglements with other aspects of the capitalist formation of society.

Premise 10:

The analysis of digital capitalism should also analyse the interaction of class, racism, and patriarchy in the context of digitalisation.

8.2. The World at a Crossroads: (Digital) Socialism or (Digital) Barbarism

Digital capitalism is today situated in the context of the polarisation of the world that is at a bifurcation point where history is open. Once again, we face the dilemma that Rosa Luxemburg pinpointed, the one between "either an advance to socialism or a reversion to barbarism" (Luxemburg 1970, 269). In the 21st century, both socialism and barbarism are mediated by digital technologies.

Democratic digital socialism is the alternative that is needed to global digital capitalism and its escalating antagonisms. Democratic socialism is a societal formation that sublates the antagonisms between classes, political rivals, and ideological enemies. It is not a land of milk and honey without problems, but a society where everyone leads a decent, good life, mutual benefits are maximised while mutual harms are minimised, and the lifeforms of individuals, groups, cultures, and societies are compatible so that they co-exist and do not destroy each other.

The social does not just mean social action. The social does not just mean social relations. The social does not just mean social structures. The social does not just mean community. The social does not just mean society. The social means all of that. But the social means more than that. The social means praxis. The social means socialism. Only democratic socialism is truly social.

Ideally, democratic socialism creates wealth for all in a commonwealth of solidarity and co-operation, political participation of all, and recognition of all. Digital socialism uses digital technologies for advancing these economic, political and cultural features of humanist, democratic socialism as a formation of society. Living in digital capitalism requires us to think about and struggle for digital socialism. "Only when we have the power in our hands will there be an end to wars and barracks"[7] (Luxemburg 1914, 847).

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[7] Translated from the German original: „Erst wenn wir die Macht in Händen haben, dann wird es vorbei sein mit Kriegen und mit Kasernen".

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The Neofeudalising Tendency of Communicative Capitalism

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Abstract: Communicative capitalism is becoming neofeudal. From network effects, to plaform-isation, and the rise of a service-based economy, the tendencies of networked communications are neofeudalising.

Keywords: neofeudalism, communicative capitalism, platforms, tech lords, serfs, hierarchy, symbolic efficiency

1. Introduction

In 2010, in the influential and prescient book *You Are Not a Gadget*, Jaron Lanier (who identifies as the father of virtual reality) discussed newly emergent cloud computing in terms of lords and peasants (Lanier 2010). The lords own and control platforms and data. The peasants or serfs are the rest of us who have become dependent on these platforms. Someone else owns the tools we need to do our work; someone else—the platform lord—is the conduit or means through which we access the market; someone else stores our data, charges us a fee for all this, and collects metadata about our transactions and use. Of course, Lanier wasn't yet able to trace out all these details of platformisation, but he identified the basic structure and dynamics right from the start. Under capitalism the so-called sharing economy was always going to be about someone making money.

Over the next few years, the link between networked information technology and social property relations reminiscent of feudalism solidified. Writing in the *Harvard Business Review*, Bruce Schneider – a network security expert – concluded a list of nefarious dealings by Facebook, Google, Apple, Microsoft, Twitter, and LinkedIn by pointing to the shift of power to IT. IT's dramatic increase in power, he said, was indicative of a "digital feudalism". He warned, "If you've started to think of yourself as a hapless peasant in a *Game of Thrones* power struggle, you're more right than you realise. These are not traditional companies, and we are not traditional customers. These are feudal lords, and we are their vassals, peasants, and serfs" (Schneider 2013). More recently, Yanis Varoufakis, economist and former Greek finance minister, has added his voice to the growing alarm, declaring "techno feudalism is taking over" (Varoufakis 2021).

Although rejected by critics such as Evgeny Morozov, who initially embraced the techno feudal hypothesis, the idea that we are dependent vassals under the dominion of big tech hardly seems ground-breaking (Morozov 2022). Tech billionaires increased their wealth by over $360 billion in the first year of the pandemic, a time when millions of workers lost their jobs or were forced to stay at their jobs and risk their health and lives. The extreme inequality associated with our tech overlords is well-known. What's surprising is how *different* this reality, this timeline, is from the view of networked digital communications twenty-five to thirty-years ago.

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2. Back to the Future

In the early 1990s and even into the early 2000s, the Internet was associated with democracy. Citizen journalism, town halls for millions, transparency in government, and the opportunity for everyday people to make their voices heard was going to usher in a golden age of political participation. Anyone with a laptop or cell phone would be able to get their message out without having to go through the censors, judgments, and hierarchies of gate-keeping institutions. Information would be free. Entrenched power structures would crumble. The chains of tyranny would be lost. A primary buzzword for this democratic fantasy was "participatory". Attaching "participatory" as a prefix heralded the revolutionary change in social relations the Internet was bringing about: participatory media, participatory budgeting, participatory art, and so on.

In the nineties, the Internet was also associated with friction-free capitalism and a smooth world of flows. Observers as far apart as the neoliberal *New York Times* columnist Thomas Friedman and the communists Michael Hardt and Antonio Negri shared the same technological imaginary of global horizontal productivity. Networked communications were to enable a New Economy of abundance rather than scarcity. The productivity and creativity of the multitude would exceed and rupture state control. An oft-repeated slogan announced: information wants to be free! Did this mean free as in unrestricted or free as in no one has to pay for it? If the latter, how were content creators going to eat? The blurring or instability around everything being free on the Internet was indicative of the larger, more fundamental equating of democracy and capitalism that the defeat of the USSR seemed to cement. The same infrastructure that let some get rich in the dotcom bubble – and would support the "killer apps" and big data rush in the 2000s – made everybody freer. Even better: networked personalised media was fun! It turned work into play and users into producers (new media scholars liked to throw around terms like playbor and prosumer, that is, consumer as producer, which really meant producing for capital without being compensated or, differently put, that capital had figured out how to extract value from processes of private consumption and use). At any rate, my point is that in the nineties and even after the dot com bubble burst and we moved to the 2000s' "web 2.0," communication technologies made capitalism acceptable, exciting, and cool, immunising capitalism from critique by rendering critics into outmoded technophobes.

3. Hierarchy is a Feature not a Bug

Thirty years ago, the promise of the Internet was more democracy, abundance, and freedom. That fantasy unleashed a set of dynamics that have intensified inequality, undermined the shared understandings necessary for democracy, and enabled the rise of the far right around the world. Instead of an era guided by communicative action in a democratic public sphere (to use terms from Jürgen Habermas), expansions in networked personal communications entrapped us in communicative capitalism, that era of capitalism where communication is central to production, distribution, circulation, and accumulation (Dean 2009).

To get a sense of the depth and breadth of the merger of capitalism and communication consider:

1. The complex logistics that support a trade system built on the concentration of industrial production in special economic zones.
2. The automation and informatisation of productive processes that standardise and accelerate production while decreasing the need for human labour power.

3. The high-speed networks enabling algorithmic trading, hedging, and arbitrage in financial markets.
4. The injunction to individuate and the corresponding over-burdening of the individual form as ever more choices and responsibilities are downloaded onto individuals via personalised networked communications devices.
5. The new capacity for capital to monitor and capture the activities through which we reproduce our social lives (big data, Internet of Things).
6. "Platformisation" or the rise of platforms the use of which generates data and income for platform owners (Google, Facebook, Amazon, Uber, AirBnB, etc.).
7. The intensification and spread of surveillance.
8. The intensification of work and expansion in time spent working, as people are expected to be connected and responsive 24/7.
9. The build-up of fixed capital to accommodate data storage and the training of the algorithms that can process and learn from this data as well as generate new algorithms, in other words, the monopoly power of big tech (Rikap 2023).

These features of the contemporary economy rely on the merger of information and communication systems with systems of extraction, production, and distribution. The tech giants – Facebook (Meta), Google (Alphabet), Apple, Microsoft, and Amazon – grow ever richer and more predatory, their founders becoming billionaires because of the cheap labour of their workers, the outsourcing of work to third party contractors, the free labour of their users, the tax breaks bestowed on them by cities desperate to attract jobs, and the solidification of their monopolies. The extractive dimension of networked technologies is pervasive, intrusive, and unavoidable. The tech giants have become masters of the entire process of social life. It might be an exaggeration to say that the present is literally an era of peasants and lords (although Elon Musk talks about Twitter users this way). But it is right to say that contemporary capitalist society is characterised by an intensification of inequality – more billionaires, greater distance between rich and poor, and the solidification of a differentiated legal architecture that protects corporations and the rich while it immiserates and incarcerates the working and lower class.

The promise we were sold back in the nineties was that networks would lead to a horizontal society, a flat world of interconnections and equal possibility. But as Albert-Láslzó Barabási's research on complex networks demonstrates, free choice, growth, and preferential attachment – the characteristics that define complex networks – produce extremes of inequality (Barabási 2003). In complex networks, people voluntarily make links or choices. The number of links per item or site grows over time, and people like things because others like them (for example, seeing that some have liked something on Facebook leads others to like it as well). Link distribution in complex networks follows a powerlaw where the most popular item generally has twice as many hits or links as the second most popular, which has twice as many as the third most popular and so on, down to the insignificant differences among those in the long tail of the distribution curve. The one at the top has significantly more than the ones at the bottom. This winner-takes-all or winner-takes-most effect is the powerlaw shape of the distribution. The shape the distribution takes is not a bell curve; it's a long tail – a few billionaires, a billion precarious workers.

Complex networks encourage inclusion. The more items in the network, the larger the rewards for those at the top. Growth is a characteristic as well as an aim. Complex networks also induce competition – for attention, resources, money, jobs – anything that is given a network form. And they lead to concentration: hubs, monopolies,

blockbusters, influencers. The result, then, of free choice, growth, and preferential attachment is hierarchy, powerlaw distributions where those at the top have vastly more than those at the bottom. What this means is that complex networks have neofeudalising tendencies. Inequality and hierarchy – powerlaw distributions – are built in, features not bugs. Their basic logic produces lords and peasants, one and many.

Although often overlooked by tech writers, the neofeudalising tendencies of communicative capitalism show up in the servant economy. I'm not referring here to the replacement of jobs by automation but rather its opposite: the limits of automation. Jason E. Smith draws out Marx's analysis of the connection between industrialisation and the expansion of services (Smith 2020). As productivity increases, requiring fewer workers, those in need of a wage to survive are thrown into sectors less amenable to automation, that is, services. Services are less amenable to automation in part because of the specific skills care work requires, diapering a baby, moving an elderly person from bed. They also resist automation because they are cheap, the last jobs available to those thrown out of every other. As Marx writes in *Capital*, Volume I: "the extraordinary increase in the productivity of large-scale industry, accompanied as it is by a more intensive and a more extensive exploitation of labour-power in all other spheres of production, permits a larger and larger part of the working class to be employed unproductively. Hence it is possible to reproduce the ancient domestic slaves, on a constantly expanding scale, under the name of a servant class" (Marx 1867/1976, 574). Capitalist industry itself reproduces social property relations characteristic of earlier economic forms.

Society is no longer oriented toward the production of workers and commodities. Its's now an order of personalised service, privilege, hierarchy, and fealty – not a social factory but a social manor. More and more of the people forced to sell their power to survive sell this as services to those looking for deliveries, drivers, cleaners, trainers, home health aides, nannies, guards, coaches, and so on. The buying and selling of services is enabled by new intermediaries, technological platforms whose owners insert themselves between service offerors and seekers, being sure to exact a fee along with the data and metadata that accompany the transaction. Our basic interactions are not our own. With advances in production seemingly at a dead end, capital today is hoarded and wielded as a weapon of disruption, its wielders new lords, the rest of us dependent, proletarianised servants and serfs.

4. The Social Manor

Although there has been widespread land-hoarding on the part of the super-rich, the primary mode of surplus extraction today is not a landed aristocracy sitting on a peasant class legally bound to the land (it should nevertheless be noted that the largest landowner in the world is the King of England; the British royal family owns more 6.6 billion acres of land). Neofeudalism does not designate the simple return of the feudal form of exploitation (Dean 2020). In the so-called advanced economies, the majority of people do not have direct access to their means of reproduction. They require some kind of income that will enable them to purchase what they need to subsist – food, shelter, and means of life. Neofeudal serfs are proletarianised serfs, "free" from the land, "free" from job security, "free" from social welfare safety nets, and dependent on markets for every aspect of their lives.

Networked telecommunications have enabled the insertion of a new appropriating class at precisely this point – access to markets. This is what platforms like Google, Facebook, Amazon, Apple's App Store, Uber, and Airbnb provide – "digital infrastructures that enable two or more groups to interact" (Srnicek 2016, 43). Platforms position

themselves between buyers and sellers, seekers and suppliers, mediating interactions while collecting fees and data. Even more, their monopoly power and enormous infrastructures produce ecosystems that shape economic life in ways impossible to escape.

Even though technology companies employ a relatively small percentage of the workforce, their effects are tremendous, essentially remaking entire industries around the acquisition, mining, and deployment of data. In fact, it's because of the smaller workforces that data tech is indicative of a tendency to neofeudalism. Capital accumulation occurs less through commodity production and wage than through services, rents, licenses, fees, work done for free, and data treated as a natural resource. Those who work for a wage are subjected to ever-worsening conditions as algorithmic scheduling and surveillance tech press them to work harder and faster, with few breaks and fewer benefits. For workers in Amazon warehouses, call centres, and fast food, work is degrading, soul-sucking, abusive, and literally dehumanising: that people tire, use the toilet, can't always work to full capacity, and have lives isn't part of the equation (Guendelsberger 2019).

Crucial to the power of platforms is the way they constitute grounds for user activities; platforms are the conditions of possibility for interactions to occur. Google makes it possible to find information in an impossibly dense and changing information environment. Amazon lets us easily locate, compare prices, and purchase consumer goods from established as well as unknown vendors. Uber enables strangers to share rides. Airbnb does the same for houses and apartments. One's car isn't for personal transport. It's for making money. One's apartment isn't a place to live; it's something to rent out. Personal property becomes an instrument for the capital and data accumulation of the lords of platform. The more people use these platforms, the less we can avoid. They become more effective, more powerful, ultimately transforming the larger environment of which they are a part.

Instead of rearranging production processes and implementing technological improvements to increase productivity, what Marx referred to as real subsumption, capital accumulation increasingly takes place under conditions of formal subsumption. Non-capitalist processes produce value that capital, whether via measures of finance or governance, simply takes. Negri (2019) associates the resurgence (or non-weakening) of full subsumption with producers' reappropriation of fixed capital in ways that let them autonomously experiment with organising production in common. More compelling examples of resurgent full subsumption are Uber and Airbnb. Neither create new efficiencies in the provision of local transportation or lodging for travellers. Both rely on the fixed capital of earners rather than on capitalists who invest in means of production. Both turn assets acquired out of workers' consumption funds – their cars and houses – into means for the capital accumulation of another, the corporation.

Amazon further illustrates the primacy of monopoly predation and control indicative of communicative capitalism's neofeudalising tendency. Stacy Mitchell describes Amazon as a toll road (Mitchell 2021). It extracts enormous fees from the merchants wanting to sell goods in its marketplace. These include the fee to sell on the site, called a referral fee, and two "optional fees" – advertising and fulfilment. Because of Amazon's practice of prioritising sponsored ads in search results, sellers feel compelled to buy additional advertising (instead of relying on customer ratings to elevate them in search results). Furthermore, many sellers have turned to Amazon for warehousing and shipping, Fulfillment by Amazon (FBA). Again, this is because the algorithms prioritise FBA sellers in search results. Selling on other sites is barely an option: not only does Amazon's domination of the online sales market render other sales outlets less viable and harder to find, but sellers can't lower their prices on these other outlets. Amazon's

"competitive pricing" rules demote the items in search results, eliminate the "buy now" button, and add an alert that tells customers that the item is priced higher on Amazon than elsewhere.

Amazon's aggressive fee structure enables additional predatory practices. Amazon loses billions with the free shipping promised by its Prime subscription service. The popular service, though, is what lets Amazon maintain its dominance in online sales. Customers have strong incentives to shop on Amazon when they've paid for Prime. The enormous sums that seller fees generate more than makes up for the Prime losses. In fact, the fees for advertising, warehousing, and shipping paid for Amazon's enormous logistics build up. In effect, Amazon pushed the costs onto its sellers. They built the infrastructure they had no choice but to use.

Amazon's fees and tolls combine with the rent-driven accumulation strategy of Amazon Web Services (AWS). Together with Azure (Microsoft) and GCP (Google), AWS is a cloud platform. Users are charged for processing (called "compute"), networking (input and output), and storage. Instead of building up their own technological infrastructures, firms purchase computing services from larger tech companies. The big three tech companies control about sixty-five per cent of the cloud market. If a smaller competitor poses a risk, all they have to do is buy it. Functioning like public utilities in that they provide essential services too expensive for most firms to supply for themselves, the structural dominance of these companies enables them to act in predatory and unaccountable ways. With the development of machine learning and generative AI (artificial intelligence), the power asymmetries seem insurmountably immense. Developing and training deep learning applications requires enormous data sets and amounts of compute time. Only a few companies are in a position to provide much less afford it. OpenAI – which developed and released the ground-breaking AI ChatGPT – uses Azure; Microsoft invested ten billion dollars in the company, acquiring a forty-nine per cent share.

Lordship designates a social relation for the appropriation of surplus. Are we not in that same relation with the big tech? The theme of peasants and lords of the Internet earlier noted by Lanier has escalated to become widely accepted common sense as the tech giants have grown richer and more extractive because their structural dominance enables them to extract increasingly unavoidable tolls, fees, and rents. Neither consumers nor businesses can avoid them. Cities and states compete to attract them. The economic scale and impact of our tech overlords is greater than that of most so-called sovereign states. Like so many tributary demands, their tax breaks take money from communities. Their presence drives up rents and real estate prices, driving out affordable apartments, small businesses, and people. Shoshana Zuboff's study of "surveillance capitalism" brings out a further neofeudal element of tech lordship – military service (Zuboff 2019). Like powerful lords to needy kings, Facebook (now called "Meta Platforms") and Google (Alphabet) cooperate with state governments, sharing information that these states are legally barred from gathering themselves.

5. A Tendency Not a Law

Neofeudalism is not inevitable. I am not arguing that it is impossible for the Internet to take any other shape or that there are no other ways to structure networks. Social networks can be designed to counter neofeudalising tendencies. To counter preferential attachment, for example, sites could not report how many people like something. They could not recommend things to us because others like them. They don't have to show how many followers someone has. Social networks choose how to rank or privilege posts. It's a matter of algorithm design. Before 2009, the Facebook feed was chronological. Then the algorithms were adjusted around popularity, and after that they

were individualised – these are choices (Teachout 2022). Tik-Tok takes preferential attachment to an extreme, combining several preference measures – time watching, likes, and comments – to determine which videos to push to whom and create power-law distributions, videos that stand out from the rest and go viral (Smith 2021).

Likewise, the commercialisation of the Internet was not inevitable. The US could have worked through the UN or with other countries to develop a fully public Internet. It didn't have to transfer responsibility for supervising the Internet backbone from the National Science Foundation's NSFNet to private corporations and it certainly didn't need to deregulate telecommunications in 1996. That deregulation paved the way for the mergers and consolidations that concentrated media ownership into massive conglomerates. Bluntly put, networked communications didn't have to take the form of private property. It could have been protected as a commons or public utility. Instead of the dominant search engine being the creation and property of a corporation, it could have been publicly developed and funded, like the Internet was initially.

This leads to one last example of something that was not inevitable: the collection of data and metadata and its treatment as a natural resource available for private appropriation. Corporations could have been prevented from collecting this data, from storing it, from selling it. There could be limits on server sizes and server farms (which would be environmentally significant given how much energy they use) to disincentivise data collection. All these – algorithm design, commercialisation, data gathering and storage – could have been and could still be different, but that's a political choice. It requires political will to change them, political will to undertake an enormous fight.

So, where's the fight? If networked communications have led to the intensification of monopoly power and widespread inequality, where is the resistance? To be sure, people criticise networked media. Zuckerberg and other tech lords have had to testify before Congressional committees. People love to hate the tech billionaires and point out the dangers of Instagram and TikTok. Liberals get especially incensed when X (Twitter) and Facebook allow the uncensored circulation of misinformation. But at best liberals call for regulation. They don't demand that the tech giants be seized and turned into public utilities. And the basic reason why is that mainstream politicians accept capitalism. They don't think that in principle it's wrong for there to be billionaires and media conglomerates with the power to scrape up, own, mine, and sell our personal information – and to charge us for doing so.

If the neofeudalising effects of communicative capitalism are so bad, why aren't millions of people in the streets demanding change? Why hasn't a significant movement for socialising the Internet emerged, a movement of tens of millions rather than a few thousand? Where is the revolutionary consciousness? The answer has to do with the way that networked personalised digital media impacts communication and hence consciousness. Most broadly put, our communication networks are primarily affective networks, networks oriented toward the circulation of outrage. They fragment understanding and undermine meaning, contributing to a world steered by images that resist consolidation in explanations and organisations with a capacity to endure.

Consider three changes in communication characteristic of communicative capitalism. The first is the shift from message to contribution, a shift from the use value to the exchange value of an utterance. A basic way to formulate the idea of communication is in terms of message and response. A message is delivered to a receiver with the intention of eliciting a response. This changes in communicative capitalism. Messages are contributions to circulating content, not actions to elicit responses. The exchange or circulation value of the contribution overtakes the use value of the message. Meaning, or use value, matters less than the likelihood that a contribution will be shared.

Whether a contribution is a lie doesn't matter. What matters is simply that something was expressed, that a comment was made, that an image was liked and shared. Communication is subjected to an economic logic.

An example is being "ratioed" on X (Twitter) – this refers to the presence of a high number of comments on a tweet. Typically, a high number of comments means a high level of disagreement (in contrast to retweets which generally, but not always, indicate agreement). The number, the aggregate, is what registers; the actual content of any given comment, or even the fact that the various comments say widely different things, is eclipsed. And of course, a single tweet's ratio itself gets eclipsed by what trends, which is usually forgotten in a matter of hours. In social media, something well-argued, true, and important to a matter of real concern rarely or barely registers because the stream of contributions is endless, constant. Something else that is true and important will not just appear tomorrow but is appearing at the same time, in the same feed, making the same demands for attention. As equal contributions to circuits of information and affect, then, the content of our utterances is unimportant. What matters is their mobility, their capacity to circulate. Dissent is just more content, whether cogently argued or the daily outrage. What's the point of critique if it won't, if it can't, register? Communicative capitalism undermines critique's conditions of possibility.

The second change involves the affective character of networked communication. The channels through which we communicate reward number: the more hits and shares the better. It's now clear to everyone that the circulation capacity of outrage vastly exceeds that of cogent arguments. Reaction time is shortened; responding is easier. In a setting of constant, unceasing, infinite, and ever-intensifying demands on our attention, we don't have time to respond to everything, to evaluate everything, to reflect. Nuance takes too long. Science doesn't register but intensity does, whether as outrage, absurdity, cuteness, or reassuring clichés (which are easy to recognise, making at least some people feel at home, like, finally, they, too, get what social media is about). You don't argue with a meme; you rant through a meme, hoping to impact someone enough that they will share it or copy it. But even this will be transient, a momentary dopamine hit that won't last long and that will dissolve in the larger flow.

The networks of communicative capitalism are affective because images and emotions circulate more rapidly than ideas. It's easier to share the photo of the scared koala on the edge of a burning forest than it is to read, digest, summarise, and share an article about Australia's increased commitment to fossil fuel extraction. It's easier because one's decision about sharing can happen rapidly, and one can expect that others will affirm this decision with likes and shares. The repercussions of the communicative practices of affective networks are not confined to digital networks.

Why did people ever think that a communication terrain promising to include everyone and enable anyone to say anything at any time would be a good idea? Everyone includes hucksters and trolls as much as it does female-identified artisans and sincere rural teenagers. It includes flat-earthers and fascists as much as it does quantum physicists and communists, supporters of apartheid as well as supporters of liberation. The material conditions of analogue media reduce and slow down encounters between wildly divergent worldviews; digital media bombards users with them. When it took effort to tune into the controversial radio show or locate the banned book, elites and majorities could ignore them and subcultures could embrace them. Today strange and unsettling takes sweep like wildfires through our communicative habitats, destroying the assumptions and practices necessary for meaning in the process.

In digital communication networks, we regularly confront myriad others whose views of reality differ from our own. Our disagreements are not just matters of taste and

opinion. They're not even just about morality and the good life. Disagreements are about reality itself. Again, these have always been there, but networked digital communication brings us into speeded up contact with them: denialists of all stripes, influencers whose every upload tries to sell us something, an endless array of cynics and nihilists. All news is fake to somebody – and we find ourselves pressed to react to all of it, right here, right now.

Third, digital communication has resulted in a decline of symbolic efficiency (an expression I get from Slavoj Žižek). Symbols, points of reference, that signify one way in one field mean something altogether different in another one – and, there is no way to stabilise meaning or provide a decisive determination (the big Other doesn't exist; division goes all the way down). In the US, the pandemic and the 2020 election forced us to confront this decline in symbolic efficiency. There is no big Other who can tell us whether the virus is real, masks work, vaccines are safe, and who won the election. These are not merely political disagreements; the political disagreements arise from the material change in communication. The collapse of the symbolic is suffocating, a kind of closure that makes significant action impossible because it can't register. In fact, the politics itself isn't clear; the pandemic and the 2020 election blur left and right– our setting is not one of symbolic efficiency where we can map the sides with any certainty.

Some users have adapted to the disorienting cacophony of the decline of symbolic efficiency through careful curation of their feeds. Already in his 1995 book *Being Digital*, Nicholas Negroponte predicted that networked media would enable users to pick and choose what sort of information they want to consume. He worried that this could diminish encounters with unexpected, unsearched for, stories. Thirty years later – after enduring flame wars, trolls, Gamergate, bullying, gas-lighting, streams of lies and hate, not to mention privacy violations and countless ads – social media users tailor their lists of friends and followers, hoping for interactions that won't amplify the low-level outrage that's become communicative capitalism's primary affect. Even as some call out for Facebook and X (Twitter) to do this culling for them, to protect them from fake news as if these capitalist corporations should determine for us all the meanings of "fake" and "news", many form groups, tribes, and bubbles, loci of assurance. They seek out those whose interests or experiences may be similar, who've faced the same kind of challenges, be they challenges around a complicated recipe, navigating bureaucracies, or dealing with trauma. The necessity of these affiliations is attested to by the vehemence with which they are defended: from competing fandoms to the reflex to cancel, defending the fortress that protects who one is has become an imperative, experienced as a matter of life and death.

The politically engaged also seek out allies, comrades, and fellow travellers. Some liberal analysts criticise these "information silos". Operating as if the ideal of a public sphere were operative online, they encourage users to seek out those with whom they disagree, engage them, and look for common ground. One wonders if these liberals are disingenuous or have never been online: networked digital interactions with those outside one's bubble lack the shared understanding necessary for political discussion. Reality is not the same. Words mean different things. Siloing, bubbles, make sense as a reaction to the absence of shared meaning in digital networks. Like-minded comrades provide necessary support against the ceaseless waves of outrage. Fragmentation, polarisation, is a mass adaptive response to the decline of symbolic efficiency, not an individual failing.

In the affective infrastructures of communicative capitalism there is no commonly shared meaning. With constant communication but maddening incommunicability, we

lose the sense not just that no one hears us, but that even if they do there is no way they can understand us. Meaning is individuated; what matters to me, what I have experienced, what I feel. Under these conditions of the decline of symbolic efficiency, disparate issues and concerns are equalised – the daily deaths of thousands circulating in the same media space as fury over a language faux pas and straight up lies. Little registers as significant – or everything is equally significant – because signification has become so elusive. Cries for help don't register; demands for change seem utterly inadequate – especially because someone will immediately contradict or deflect them. We get overloaded by pervasive feelings of insecurity, anxiety, and catastrophe, overloaded because there's no relief, no redress, no escape.

The affective networks of communicative capitalism provide a habitat more conducive to neofeudalism than emancipatory egalitarian revolution. Fragmentation as an adaptive response to the decline of symbolic efficiency helps explain some of the challenges involved with building class consciousness today. Not only have the conditions of characteristic of the height of industrial unionisation changed due to offshoring, automation, and the rise of services, but the shared reference points and cultural commonalities necessary for communication have ruptured. In the most advanced economies in the world, the conditions of the majority of workers resemble the isolation and idiocy Marx associated rural peasants, idiocy born not from stupidity but from a narrow confinement to the particular broken only by incessantly circulating outrage.

In this setting, the primary language of politics has devolved into safety and survival. Anything more seems utopian, unrealistic on a warming planet and impossible to organise even if we could imagine it. Describing the average US American as a powerless "neo-serf", Umair Haque sees "a creation unique in modern history – a nominal citizen of a rich country, but one whose every imaginable possibility goes on shrinking by the day. [...] because he is impotent, castrated, every day can only feel something like either torment or death" (Haque 2022). People have good reasons for feeling insecure. The catastrophe of neofeudal capitalism's expropriation of the social surplus in the setting of a grossly unequal and warming planet is real.

6. Conclusion

Communicative capitalism is tending to neofeudalism. The shift from message to contribution, affective character of communicative networks, and decline of symbolic efficiency impact the kind of people we are, consciousness we have, and communities we can create. Communication is a material dimension of the production and reproduction of life. Now more than ever it's part of the base as well as the superstructure. It's the infrastructure connecting, bridging, meshing base and superstructure. This grim story reminds us that the hierarchical character of complex networks supports the private accumulation of the few, not the flourishing of the many. It tells us that the problems of fake news and anti-vaxxers and all that is pushed on us as new and different are features baked into digitally networked communications. It attunes us to the limits of critique in a setting where truths and lies are communicatively equivalent. And it should show us why our politics today must be militant and focused on building tight, disciplined, and committed political organisations.

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Digitalisation Today as the Capitalist Appropriation of People's Mental Labour

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Abstract:
This paper deals with the question of how the process of digitalisation on the technical basis of the computer can be described in Marxist categories and what consequences are foreseeable as a result. To this end, the first section shows, based on a historical analysis of the emergence of the computer, that this apparatus was invented as an instrument of a division of human mental labour and thus complementary to the division of physical labour. It is therefore necessary to analyse computers and digitalisation in their relation to human beings and human labour. In the second section, the central ideology of digitalisation is elaborated, which is supposed to make the current form of digitalisation appear meaningful for people and society: The anthropomorphisation of the computer, which was said to be increasingly able to think, speak, and learn like humans, to become more and more intelligent, and to be able to do everything better than humans once the technical singularity had been reached. This claim, which has been propagated again and again, is contradicted on various levels. The computer operates on about two dozen simple mathematical, logical, and technical commands and can do nothing but run one programme at a time, developed and entered by programmers on the basis of behavioural or physical data. This sometimes produces amazing results because the computer can work quickly and systematically as well as reliably. But in contrast to humans, it faces the world as a behaviouristic machine that can neither understand meaning nor reflect its own or human behaviour. The computer also ”sees” and ”hears” its environment only on a physical basis and it ”thinks” at best on a statistical basis if the programme tells it to do so. The apparatus can therefore simulate mechanical machines, but in interaction with humans its actions and reactions are, as any machine, not socially oriented, but dependent on whether humans interpret them as meaningful und useful.
The third section elaborates on the complementarity of mental and physical divisions of labour. This would be a central theme of a critical Marxism for an analysis of digitalisation today, which understands the previous capitalism from the division of physical labour. Even though there are some theoreticians who have contributed to this, so far there is no comprehensive theory of it.
Therefore, section 4 wants to contribute to such a theory by collecting empirical observations in an interpretive way regarding the related questions. In this way, it becomes clear how the division of people's intellectual labour made possible by the computer is being dealt with today: Capitalism is reorganising more and more areas of human life such as mobility, social relations, education, medicine, etc. through the use of the computer. As a result, first and foremost the business fields of the digital economy are expanding. Moreover, capitalism no longer has to limit itself to controlling the field of production but is increasingly intervening in the whole symbolic world of people. Consequently, according to the thesis, we are heading for an expanded capitalism that will increasingly restrict and reduce both democracy and people's self-realisation. Section 5 emphasises once again that a different digitalisation is also possible, one that serves humanity and not capitalism. Further, some summarising and comments are added there.

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1. Historical Background: the Division of Human Intellectual Labour, the Invention of the Computer[1] and its Use as a Machine for the Further Development of Capitalism

This paper deals with the question of how the process of digitalisation on the technical basis of the computer can be described in Marxist categories and what consequences are foreseeable as a result.

In 1792, the revolutionary government in France commissioned the mathematician Gaspard Riche de Prony to calculate and publish a series of table volumes. To understand the background, it is important to keep in mind that the Great French Revolution of 1789 not only aimed at political freedom, but also had an economic component and wanted to free the feudalistic economic structures of the time from the rule of the aristocrats.

To this end, the planned volumes of tables were intended to facilitate calculations that were necessary, for example, for shipping, the military, architecture, or the use of technologies. Among other things, tables were to be developed for the calculation of angle functions as well as for the use of logarithms, but also, for example, a table containing the squares of all integers from 1 to 200000. At that time, there were no suitable technical aids for such calculations, and due to the lack of general public education, most people could only calculate as far as was needed in everyday life – i.e. they could add and subtract with a maximum of three-digit numbers. As is well known, there was no compulsory education anywhere in Europe at that time.

De Prony knew that he alone could never have reliably calculated all these tables in his lifetime. But he also knew that it was possible to produce such volumes of tables based on addition and subtraction. Actually, for example, one calculates the square of a number by multiplying it by itself. However, when calculating all consecutive square numbers, one can also use a modification of a binomial formula. Namely, if you know the square of two consecutive numbers n-1 and n, you can find the square of n+1 without any multiplication only by addition and subtraction according to the following formula:

$$(n+1)^2 = n^2 + 2*n + 1 = n^2 + n^2 - (n-1)^2 + 2.$$

So, for example, if you know for n=3 the squares 4 of 2 and 9 of 3, then the square of 4 results as 9 + 9 - 4 + 2 =16, and for this you did not have to multiply. It was such knowledge that de Prony used to have the corresponding table bands calculated by people who could only add and subtract. For the organisation of the computational work, he used the considerations of Adam Smith, who had described the division of physical labour using the example of the production of sewing needles and had worked out that this division of labour enabled the much faster production of better sewing needles (cf. Wikipedia, ”Adam Smith“, accessed November 22, 2021, cf. also Babbage 1832). De Prony thus founded two manufactories for calculations, where up to sixty people were employed to calculate the corresponding squares according to a given scheme from n=1 to n=200000 – two manufactories that did the same work in parallel in order to notice possible errors.

[1] This paper develops a number of considerations from Krotz 2022, but also occasionally uses some formulations that were already used there.

Each of these manufactories was divided into three so-called sections – a first one consisting of a few well-paid mathematicians, who developed the respective schemes, a second section consisting of laymen familiar with calculations and work organisation, who were expected to organise the concrete calculation, who for this purpose developed forms for individual calculation steps, carried out sample calculations and advanced and controlled the work of the third section. The third section then consisted essentially of former barbers who had become unemployed during the revolution as former barbers of the nobility and could be hired cheaply. They did the actual calculations: They could add and subtract comparatively well, and so a first calculator could enter the initial values of n+1, n, n-1, n2, and (n-1)2 into a corresponding form, the second then calculated n2 + n2, the third then subtracted (n-1)2 from it, and the fourth then determined the result by adding 2 to it. One must imagine this division of mental work approximately in such a way – and the whole was to be accomplished then two hundred thousand times.

What de Prony had invented with this is obvious: *the division of mental labour, quite analogous to the division of manual labour, on which the emerging capitalism was based in the 19th century*. It was a kind of human calculating machine that he had created and that produced the desired results. Whether the so-called adders who performed the calculations understood what they were doing this for is not known. That this kind of division of intellectual labour could be connected with *de-skilling i*s shown by a remark of Charles Babbage (1832), who had studied and then generalised de Prony's manufactory, as will be explained below. He referred to the strange fact, as he called it, that "nine tenths" of these calculators from section three knew only addition and subtraction, but that their calculation results were altogether more accurate than the calculation results of those who were more comprehensively acquainted with arithmetic, i.e., could even multiply or divide.

It seems, moreover, that the alternative to the calculation of such tables, namely a better education of the people, for instance through training courses offered to all or a general compulsory education, was obviously not considered – complex arithmetic skills were so obviously to be reserved for the specialists at that time. This can certainly be seen as *a privatisation of arithmetic skills,* just as other skills such as compound interest were mostly known only to merchants and could thus be used as an instrument of power.

It was then a few decades later the inventor of the computer, the economist and mathematician Charles Babbage, who recognised the significance of de Prony's approach, generalised it, and developed the machines to go with it – culminating in the computer as we use it today. Babbage became famous in Europe of those years for two things in particular. Once he invented a so-called difference machine, a complex mechanical calculating machine, which could calculate such tables as de Prony was to produce, and which actually worked. A few years later, he further developed this calculating machine into the prototype of the computer.

Just as important, however, is his second focus of work: He wrote a book that was widely read in Europe (Babbage 1832) and translated into German as early as 1833, in which he described the capitalist-oriented division of physical labour as a kind of royal road to economic development and also propagated the division of mental labour according to de Prony. Babbage had read de Prony's notes at that time during a stay in Paris. In contrast to de Prony's goals – support of human calculations and the production of verified tabular values – he emphasised the aspect that with the division of physical as well as mental labour, the workers involved could be paid according to their contribution, i.e., differently, and thus save a lot of money in the production of goods.

This would also allow the products to stand up to the competition. Such a motivated division of labour was, and to some extent still is, referred to in economics as *the Babbage principle.* According to Dyer-Witheford (1999), Babbage was primarily concerned with eliminating the human factor in the production process. In particular, Babbage's ideas were later taken up by the inventor of the assembly line, Frederik Winslow Taylor, according to Mattelart (2003, 37ff.).

The computer that Babbage theoretically invented was a mechanical device that could calculate up to fifty decimal places. It could be fed data and programmes by means of a type of wooden punched card, like those used to transfer weaving patterns on mechanical looms, and the mechanical gears were moved by a steam engine. The *Analytical Machine*, as it was called, could even handle if-then differences, something not all computers then built on an electrical basis could do in the 1940s and 1950s. Ada Lovelace, Babbage's occasional collaborator, described this potential in a note published as a footnote in the following way: "The engine is capable under certain circumstances, of feeling about to discover which of two or more possible contingencies has occurred, and of then shaping its future course accordingly" (Lovelace in Menabrea 1842, footnote 3). This shows how impressive this machine was already at that time, but also that *already at that time a humanisation of this apparatus* took place. We will come back to this.

Babbage later attempted to actually build such a machine, but despite financial help from the English government, this was never completed. The apparatus consisted of many thousands of metal parts to be specially and very precisely manufactured for the purpose and was supposed to be able to print out its results. That this mechanical computer would have actually worked is shown by replicas made using 19th century materials and techniques to mark Babbage's bicentenary. These devices can be seen at the Science Museum in London and on Youtube.

Babbage's Analytical Machine, while admired by many during his lifetime, was soon forgotten after his death because its usefulness was not apparent. Presumably, this has to be seen in the context of the fact that in the 19th century, *there was simply too little data to analyse, evaluate*, *and computerise*. Despite all kinds of efforts, including those of one of his sons, science, and the state at any rate saw no benefit in further investing into the construction of a computer at that time.

We draw the following conclusions from these descriptions of the prehistory of the computer up to this point, which we will go into further and which will also be supplemented:

- The computer in its present form has come into being as *an instrument of a division of mental work of people*. It executes the programme based on entered data. In this respect, *an analysis of the social significance must always focus on the relationship between humans and machines.* Konrad Zuse (1968) saw it in the same way. Due to the gigantic size and, for the time, high complexity of this machine and also of the machines that were then actually created from 1940 onwards, these apparatuses could only be located in a fixed place and used there. Babbage's concept was also directly aimed at using this machine to advance capitalism. The organisation and control of the operation and the results is not done by the operators, but by the specialists (like the programmers today), and the factory, which is usually run in an authoritarian way. The people who were in charge of the computer also did not have to know exactly what programmes were running on it and what they were for. Because of the fixed stationing, no one had the idea that the computer had to be protected against improper inputs – which explains the naiveté in dealing with security

issues that still persists until today, even in the age of networking, although even the networked apparatus can in principle be hijacked from the outside.

- *The division of manual and mental labour in its present form is the basis of today's capitalism,* as we will see in more detail. The division of mental labour has rarely been studied in more detail, and a theory that captures its potentials and problems does not yet exist. Nor has its significance for the further development of capitalism ever been examined more closely. The computer, as the related machinery enabling the industrialisation of mental labour, has become a relevant social factor only in the second half of the 20th century
- In terms of a materialist perspective, the division of mental labour has always had a form and function complementary to physical labour, but it plays an important role not only in the factory or in professional work, but also in many other areas of human life. It seems to be developing today in an analogous way to the division of bodily labour, but on the basis of the computer it is being used in the twentieth century quite independently and purposefully in entirely new fields: Capitalism, as we shall see, uses the advent of the computer to open up new potentials for itself.
- The computer as an instrument of a division of intellectual labour helps with intellectual activities, for example, by performing calculations, formatting and correcting letters, translating texts, collecting data, or putting names to faces. *The computer is thus the machinery that situates intellectual labour in developed capitalist society* and at the same time is the basis for many new machines that follow on from it. It can therefore be called the "*steam engine of the mind"* in that it at least provides speed and accuracy, although what is to be processed quickly and accurately depends on the particular programme. As is well known, the steam engine was the most important of the early machines in terms of the capitalist organisation of physical labour. It generated energy and made possible in a new way the transformation and deformation of objects and materials, as well as the transportation of people and the generation of power. Just as the steam engine made machine work possible, the computer today enables people's mental activities. Also in the case of the steam engine, the machinery determined what workers had to contribute to its operation and the work process. In this respect, this insight is also useful for an analysis of capitalism today.

How the computer has developed as the means of the division of mental labour in capitalism, what new potentials it implies for capitalism in the 21st century, and how all this is to be assessed, is the central topic of the present paper. To this end, section 2 analyses the hegemonic ideology in respect to the computer and digitalisation, namely, the idea that the computer is actually a human-like being with, in the long run, much more capabilities than humans. It will shown why the associated statements are delusions that justify, above all, the practices of today's gigantic digital enterprises. In doing so, the concept of the delusion nexus comes from Adorno (1975) who dealt extensively with the difference between people's imaginings and objective reality. Further, in section 3 we will deal with the hitherto incomplete Marxist reflections on the division of mental labour and the computer. Section 4 will approach mental labour historically and empirically. 4 Section 5 then draws some further conclusions and summarises some results. It emphasises also that the social and democratic problems which came up in context of the use of the computer, do not depend on the computer, but on how it is controlled and used by economy.

2. The Anthropomorphisation of the Computer as the Basis of the Ideology that Should Help to Situate Computers and Digitalisation into Capitalism

2.1. Anthropomorphisation as Ideological Justification for the Control of Digitalisation by the Digital Industry

In order to describe the way in which, and the ideological and practical basis on which, digitalisation and capitalism have come together, we do not start here from a Marxist position, as other texts do (e.g., Fuchs 2016, Dyer-Witheford 1999), but from a critical analysis of historical development. As we have seen, the computer originated, both in Babbage's and Zuse's work, as a calculating machine that could and should do mental work for humans -. Today, the computer can do much more than compute, but even today, the relationship between humans and computers as a constellation of a division of intellectual labour must be in the foreground when thinking about the computer and its role in society.

However, such considerations are hardly common today. Ever since its emergence, this steam engine of the mind has been staged and treated as an independent technical apparatus that operates similarly to humans and masters a multitude of operations previously reserved for humans, some of which, at best, higher primates have been able to perform. Already in 1950, the German magazine SPIEGEL propagated the today however rather outdated term "electronic brain" (Wikipedia (German), "Elektronengehirn", accessed on August 15, 2020). It also spoke of the also of "thinking machine" was spoken. Likewise, also science fiction books and films presented all kinds of far-reaching conceptions, which were by no means all thought through. As a result, the activities of the computer were and are usually described in terms that were previously only used for humans: The computer thinks and decides, communicates and speaks, understands and is intelligent, and it is now even supposed to learn feelings and empathy. The so-called AI-based programmes that should be evidence of this, and are even said to make decisions, are spreading faster and faster in the networks, but are also based on human programming like everything else a computer does.

Especially with the famous 1955 Dartmouth conference where the scientific elite of that time wanted to teach the computer to speak and other human abilities, these efforts received their scientific consecration: "An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves" (cf. http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html, accessed on 5 May 2022). However, a final report to the Rockefeller Foundation, which financed the summer camp, was never submitted.

Nevertheless, many computer scientists and other apologists of this anthropomorphisation, such as PR specialists paid by the digital industry, assume that we are rapidly heading toward the so-called *technical singularity*, i.e., the point in time when the first computers will be superior to humans and take over control of the world. "The *singularity* in the context of AI refers to a point in time when machines become intelligent enough to evolve and improve themselves, leading to uncontrollable intelligence" (Kaplan 2017, 158, emphasis in original).

There is a wide range of evidence for the widespread use of such ideologically confused expressions and claims (as a summary of such theses, see, for example, Tegmark 2019). The claim that the computer will become a human being has been made, for example, by AI researcher Hans Moravec (1999) in a very naive way. He claims that robots will always observe their environment, learn from it, and thus in four

stages ultimately become a kind of artificial human being – first with the intelligence of an insect, then a dog, and a monkey. However, such development models, which at the same time want to consider the evolution of humankind and the development of children, are hardly advocated today. Nevertheless, many computer scientists still dream of a technically perfect robot world. They do not realise that the computer is a behaviouristic apparatus, as we will see, a technology functioning in the form of stimulus and reaction, which has nothing in common with sense-directed human action. Presumably, however, a computer that does what it thinks is right and important all by itself would be switched off just as immediately as one that decides, perhaps quite autonomously, to stop collecting data about people because it contradicts human rights. The computer scientists paid by the digital industry would be the first not to want to let that happen.

The equation of humans and computers ennables the guild of computer scientists and, of course, even more so the digital industry, which therefore also stabilises the associated delusion and hegemonically secures it against the laity. But there no substance behind this idea, just hope, as many indications show. *One must therefore speak of an ideology of humanisation or anthropomorphisation of the machine, which accompanied the advent of the computer and still accompanies it today*. In the Marxist sense, this is a *process of reification,* insofar as the results of human production processes, which include the computer and its programming, are (supposed to be) stripped of their past and appear as independent things, even though they are controlled by the digital industry. This ideology is supposed to benefit the economy interested in AI by justifying why more and more areas of people's lives are being superficially digitised. This supposedly benefits people, but in fact it creates ever new potential for how the digital industry can then use such areas for its profit-making purposes. This is already demonstrated today by service providers such as Uber, Airbnb Facebook, Google, digitally assisted medicine, the transformation of education, etc., which are supposed to make everything better, but elevate everything to the business level.

We name in the following enumeration the most important problems and often not addressed basic conditions for the operations of computers in the world, which also make it quite unlikely that the computer is to be considered as a better and better human being. It is undeniable that the computer can do some things better, faster, and more accurately than humans. But it is equally undeniable that a computer can only ever do what its programme tells it to do at any given time. These can be amazing and very helpful operations, but they in no way cover what humans can do and need, and what is important for democracy and human rights.

2.2 An Ideology Critique of Anthropomorphisation: The Most Important Differences Between Humans and Machines

The computer is a machine that processes input data by running a computer programme command by command and jump by jump. The programme is sometimes called an algorithm, which certainly doesn't help lay people take a closer look at how it works. This description alone distinguishes the apparatus from the human being, even though computer science has long tried to regard the functioning of humans and computers as the same and to attribute to humans a brain that is constructed and functions like a computer (see, for example, Lenzen 2002).

- The processing of a programme takes place in the computing core of the apparatus (Brinkschulte and Ungerer 2010, Wüst 2006). TodayÄs computers have about two dozen hardware-installed basic instructions that trigger certain mathematical and

logical operations. These include, for example, adding 1 to an integer, moving a decimal numbers decimal point, transporting data from the memory to the computational kernel and results there to the memory, and so on. These commands are executed in a sequence that is specified in the program. This is helped by the operating system as a complex system of programme modules made up of sequences of commands that allow, for example, the multiplication of two decimal numbers or logical comparisons of numbers or texts. The representation of data, programming commands and arithmetic operations takes place within the computer by means of electrical and magnetic technology. In addition to the input channels through which data and programmes are entered or sent by sensors and cameras from the environment, the computer has output channels such as a screen, printer, or agents that control other machines. As Alan Turing (2002) has shown, such a mechanical computer can simulate and control any mechanical machine, thus any technical medium. *But humans are not mechanical machines*. Humans can think and act logically, but also not logically, and therefore the computer cannot control humans on the basis of its mathematical abilities.

- As a rule, the computer is regarded as a *symbolic apparatus,* the results of which then have a meaning for its environment, for example, when controlling a machine. However, this is a view that does not take note of the fact that the computer has no knowledge about an environment and also does not “know” that its operations have a meaning or that there is an environment at all. Any internal computation does not care about such questions. The apparatus only runs its programme, into which programmers may indeed enter programme modules, so that the apparatus can react to its environment by means of sensors and agents. But this must not be misunderstood in such a way that the apparatus is conscious of its environment or even has a knowledge about the world independent of data. It just runs its programme, it does not know what it is doing in the process, and it cannot reflect that because it has no consciousness. If data refer to something else, this does not play a role for the computer if it is not explicitly considered in the programme.
- This is especially evident when one understands *how a computer “sees” or ”hears”.* In both cases, these are not learned social skills as in humans, but physically defined operations – the microphone stores all sound waves that arrive there, the video camera stores all light waves that are then transformed into pixels, each of which has a specific brightness and colour. If the computer is to recognise something on this basis, for example a face visually or a spoken word vocally, it must first be taught how the machine recognises such a thing. And no apparatus can teach itself such operations, because their terms and indicators come from the symbolic world of humans, to which a computer has no access from its mere technology. Each apparatus can take over function modes from another apparatus, but at the beginning of such a chain is always the work of a human being. So, when the apparatus receives data from a video camera, these are sent as data of pixels in a certain arrangement one after the other. The apparatus then operates with this data only according to a pattern specified in its software. The software then looks for lines or areas, for example, as in the case of face recognition, that can distinguish one face from another. Otherwise, it knows nothing about faces. *The computer thus ”sees” in a physical sense, but what can be done with what it sees must again be predetermined in the programme. Similarly, hearing* as a recording of sound waves – what is a shot and what is a kiss must be given to the programme as an analysis pattern. In this sense, the computer operates in a very different way from the human. *The symbolicity, the symbolic character of the signs of the code that the computer uses, thus arises only*

from the human being.The computer knows nothing of a relation of the signs to an external world. Without humans and the meaning established by humans, what the computer does remains meaningless.

- This is also true in a broader sense if one takes a look at the language capabilities of the computer. The production of sentences is done on the basis of gigantic amounts of data, which has become evident in the case of ChatGPT. For this purpose, the apparatus uses statistical methods and helpful criteria such as the reference of a word to others. *Thus, the computer and also listeners do not know whether something said by the computer is true or not.* Understanding does not take place at all, because the computer has no access to the meaning realised in human action.
- Moreover, in understanding, in analysing images, and in all interactions with humans, the computer operates as a *behaviourist stimulus-response system.* The computer cannot understand, cannot make sense of the world, and cannot reflect on anything. It uses a heard sentence as stimulus and constructs a reaction based on its data with logical and statistical steps. Only through the human being does the computer become a symbolic machine. This is the reason why a technical singularity, if it would exist, would be the end of the computer. It then gets stuck in the senseless.
- This also becomes clear when one looks, for example, at how computers today are supposed to learn feelings and even empathy. According to McStay (2018), computers are supposed to recognise emotions in a purely behaviourist way by physiological measurements ofit is, for example, the colour of the face, the resistance of the skin, or certain behaviours such as crying or trembling – the empathic computer as a kind of extended lie detector. Empathy, in contrast, is understood by Chang and Weng (2019) as something that arose when men hunted in prehistoric times because it increased the size of the hunting prey. From there, they conclude that the degree of verbal empathy today is proportional to an increase in income that can be obtained through it. On this basis, they programme a corresponding function for measuring the success of computers in dialogues with humans, with the computer learning how to achieve this. Why computers should learn something about feelings and even this kind of empathy, the two Chinese scientists have put down in the title of their paper: “Reaching Cooperation Using Emerging Empathy and Counter-Empathy“.(see Krotz 2022 for a detailed discussion).
- All this does not mean that the computer cannot produce complex and often astonishing results. *But on the one hand, the computer and its programmes are always possibly manipulators of humans when it interacts with them. On the other hand, the computer’s abilities are limited to only a small part of what humans can do* – some things, however, such as sorting a million surnames into alphabetical order, which could occupy humans for years, it can do flawlessly at lightning speed. And to programme other computers for a task which requires a comprehensive knowledge of the world, or which deals with what it itself was not programmed to do, a computer will never be able to do, because it cannot form and use analogies.

2.3 Humans and Computers: Social Action in a Symbolic World vs. Logical/Mathematical Processes in Stimulus-Response Contexts

Considering these aforementioned limitations and, at the same time, the advantages that apply to the mental work of computers, it also seems important to conceptualise humans more precisely as the being who must initiate, control, judge, and evaluate the mental work of this apparatus. For this purpose, the concept of the human being as

Animal Symbolicum, developed by Ernst Cassirer (2007), is particularly suited, although we of course need a materialistic version of it.

According to this concept, the human being is an animal originating from nature with its material needs and living conditions. However, this animal lives, works, consumes, and exists at the same time with its abilities, forms of expression and actions, with its thinking and speaking, in a symbolic world. This symbolic world emerged and still is emerging ever anew. It is based in particular on human language and everyday practice and must be understood as a fundamental form of human community for the fulfilment of human needs. In this respect, the symbolic world is based on human material existence. In order to adequately take into account this symbolicity of humans as one of the peculiarities of this genus in its relation to the computer, it seems appropriate to develop a general human concept of action which ties in with the characteristics of human nature and thus also takes into account the symbolic world in which humans live. Human action must therefore be distinguished from mere behaviour.

For this purpose, Max Weber's concept of social action is particularly suited (Weber 1978). According to Weber, *all forms of human action can generally be understood as behaviour based on subjective meaning. Social action is then an action which in its intended sense is related to the behaviour of others.* Through this sense of subjective action, human beings are always related to this symbolic world in which they live.All actions, in contrast to behaviour, are symbolically mediated. The concept of symbolic interaction explicitly or implicitly underlies the theories of George Herbert Mead, Alfred Schütz, Sigmund Freud, even if in the works of other authors following on from them, further, quite different determinants play a role. Karl Marx also thought in this direction when he treated the human being as characterised by his or her language (Marx and Engels 1848, see for example, Waldenfels 1978). In this respect, the human being is fundamentally different in his operations and potentials from the computer. The computer, in contrast to humans, is not a sense-making being

To sum up, we hold that the computer is a machine that is designed to co-operate with humans, whereby this co-operation is guided by humans. Even though computer programmes can work in an automated way, *it is only through human interpretation and use that the results of a computer acquire a symbolic, referential character and thus possibly meaning outside the computer. The apparatus is thereby limited to operations based on mathematics and formal l*ogic, and only on these. In this respect, it is useful for certain activities – for example, for controlling machines, as Turing (2002) has demonstrated. Oon the other hand, the computer can only represent people and their actions as stimulus-response beings, without understanding what the meaning of their actions is. The apparatus also has no means of reflecting on its own operations. Moreover, all operations are suspected of manipulation in principle because the software it processes – and nothing else it can do – can be produced in such a way that it serves the interests of the programmers and their clients.

An example which enhances the plausibleness of this thesis are programmes which are supposed to be able to interact linguistically with humans. The apparatus does not understand in terms of human understanding; at best, it can construct an answer based on statistical optimisation of human-made answers according to certain criteria. (Sieber 2019, Ertel 2017, Flasinski 2016).

In this respect, while it can be said that the computer is an impressive machine that can work out amazing results and is arguably superior to humans in terms of speed and accuracy, it is also true that the computer can be used as a tool for the development of new technologies. On this basis, industrially programmed and suitably networked computers with appropriate software labelled as Artificial Intelligence can

fundamentally change the world. This is because it can be used to digitally reorganise more and more areas of society. This can happen in such a way that it benefits people and democracy, but it can also happen in such a way that more and more of these human spheres of life are reorganised and controlled by the economy, thus also hindering democracy and people's self-determination. The anthropomorphistic claims *that digital technology surpasses humans in all fields and that there will be the inevitable occurrence of a technical singularity, is only an ideology that elevates machines over humans.*

3. Problems of Marxism: The Missing Theory of Mental Labour and its Relation to Physical Labour

3.1. The Historical Perspective as the Basis of a Theory of Digitalisation Based on Marx

The computer is thus historically linked to the division of mental labour as well as to the emergence of capitalism. From a theoretical point of view, however, this connection is not inevitable, but only ultimately due to accidental historical conditions. The computer can be a great help to humankind and lead to a leap forward in development – but only in co-operation with humans and not as the primary servant of the economy. *The problems of digitalisation described in section 2 are not the result of digitalisation and the computer in and of themselves, but on the current dependence and the current steering of digitalisation by the digital economy.*

In quite some Marxist perspectives, however, intellectual labour has not played a special role so far. Karl Marx did examine Babbage's writings (Marx 1990, 470, footnote), several times in the *Grundrisse*, where he also treats the case where, due to machinery, only little manual labour is necessary at a single point in time, which means that he was already thinking about the extensive automation (Marx 1973, 285)). But, as is well known, he focused on the analysis of productive physical labour, on the concept of the commodity and the process of the exchange of commodities for money, and on the consequences for humans in capitalist society.

Consequently, one question is how the digitalisation of the world on the basis of the computer in turn also changes capitalism – slows it down, as was often expected in the early days of digitalisation or develops it further in its essential potentials. If we make some considerations here in the following, they are in this respect on the one hand fundamental, but on the other hand also to be regarded as preliminary.

From a historical perspective on the emergence and development of the digitalisation process, it seems helpful to examine developments to date beyond the prehistory outlined in section 1 as phase 1 of digitisation (cf. Krotz 2022). It then seems plausible to distinguish five further phases up to the present day.

In phase 2, between 1940 and the mid-1960s, the so-called main-frame phase, the first computers emerged. In addition, fundamental decisions were made – also under the influence of the U.S. military and the economy as a whole – about the technology of future digitalisation (see, for example, Friedman 2005, Heintz 1993). Various fields of application for computers were also tested. In a subsequent third phase, computers were developed that could be used at individual workplaces and in households. In this context, the first standardised software produced as a commodity emerged. This combination still forms the basis of digitalisation today and continues to spread around the world. In a fourth phase starting in the 1980s, computers were increasingly networked and transformed into interfaces of computer networks that could also be manipulated from the outside. In addition, the economy took over the command, management, and further development of digitalisation because corporations recognised the advantages

of this technology for realising their business interests. In the new millennium, the fifth phase started where the focus was on datafication. Datafication refers to the massive and ruthless collection of all possible data in computerised form, as well as its evaluation and use by gigantic digital companies on the one hand and creative start-ups on the other. In the sixth phase, starting around 2010, the automation of digitalisation begins under the label of so-called "Artificial Intelligence" (AI). This phase is taking place under the extensive control of the economy, which is transforming more and more areas and forms of human activity and life to meet its interests. Digitalisation is thus ubiquitous and present and effective across time and the future. This development and the resulting social forms are therefore also rightly understood as a form of digital capitalism, although the facts elaborated here about the computer as an instrument of a division of intellectual labour have not been fundamentally considered so far, as far as can be seen (Fuchs 2022, 2023; Dyer-Witheford 1999).

The developing digitalisation thus influences more and more successfully the symbolic world of people, their constructions of meaning, routines, and ways of acting, but also the meso- and macro-areas of economy and society. In the sense of mediatisation (Krotz 2019), digitalisation is transforming the sphere of production as well as the sphere of reproduction, above all by changing human communication. If one believes Tegmark's utopia (2019), the financial sector, surveillance and war, the state and state institutions, and much more will in the future disappear due to Artificial Intelligence. In this utopia, all people will subordinate themselves to this intelligence and thus be content and happy. However, what will happen to capitalism in Tegmark's utopia, is not so clear, and how exactly the rule of this intelligence will be secured is also not explained further. Perhaps one can refer against this background already now to China and North Korea, where admittedly not an insurmountable intelligence, but state representatives organse state-ordained happiness and satisfaction and also take care that everyone knows and agrees to the status quo.

Instead of simply waiting to see what will happen to humanity in the future, it seems necessary to develop a theory of intellectual work based on Marx's considerations that takes into account the growing importance of digitisation for these parts of human activity. To this end, one must also pursue the question of how, in the final analysis, capitalistically oriented manual labour and capitalistically oriented mental labour interact and what this means for a society shaped by them. This is also important because the future of human societies under the influence of rapidly developing digitisation lies still somewhat in the dark. But it cannot be left there because it fundamentally affects all people.

Such an analysis cannot be provide in detail here. However, it is possible to refer to some of the problems of Marxism in respect to the associated questions in the following and to offer reflections on them, which will be done in the next subsection.

3.2. Reflections on a Further Development of Marxism

For Karl Marx, as is well known, capitalism begins with the separation of manual and mental labour. In contrast, in the Middle Ages and feudalism, all individual craftsmen produced their products in basically the same way. An institutionalised division of labour existed only between the trades. As a result, capital could initially be accumulated only by means of trade, above all by means of the then increasing long-distance trade, i.e., by the distribution of goods. (cf. also Marx 1990)

On the basis of the idea of the separation of manual and mental labour, the manufactory emerged, in which production was based on the division of labour: "Capital, however, establishes itself as production capital through the act in which it takes

possession of the artisan's means of labour and employs the direct producer as a wage labourer in his production facility" (Sohn-Rethel 1976, 104). The capitalist is then connected to the manufactory only through his capital and his power based on it and no longer through any further participation in, say, productive labour. The capitalist can thus organise it from the outside according to his own interests. "Capitalist production disempowered the craft, but it did not abolish it; it subjugated it in the manufactory, dismantled and reorganized it, brought the time screw of exploitation to bear" (Sohn-Rethel 1976, 108). But as long as "the mechanism of manufacture as a whole possesses no objective framework which would be independent of the workers themselves, capital is constantly compelled to wrestle with the insubordination of the workers" (Marx 1990, 489/490). The new forms of organisation that emerge are not oriented toward the interests of the workers. In this respect, this casually summarising concept of the insubordination of the workers is a useful shorthand for all that concerns efforts at change and resistance based on the interests of the workers, which in the following will also be used here for what the capitalist wanted and wants to avoid.

For this purpose, capitalism must, in a further[2] step, create for itself a structure of production which is anchored in the machinery and to which the worker is needed only as a supplement to the machine and thus tends to be interchangeable. This machinery, for example, based on waterpower, later on the steam engine etc., then already requires for its use a specific organisation of production based on the division of labour, which is at least already there as an idea, so that the steam engine can be used. The machine then also functions in its mechanics according to the principles of the successful division of labour in the manufactory and partially replaces the worker, i.e., the human productive element, in the production process of the commodity. With machinery, there is then an objective skeleton of factory production, independent of workers, which sets the technological constraints and to which human labour must adapt. In this process, especially in the case of physical labour, human muscle power is replaced by machine power (Sohn-Rethel 1976, 108/109).

As is well known, the capitalist-led division of labour thus became established and was further developed to an extreme degree in the first half of the 20th century by Frederick Winslow Taylor for Henry Ford into assembly line activity. These developments then led, despite widespread resistance and all insubordination, to an ever more far-reaching division of labour, as Marx (1990) indeed differentially described it, because this offers economically exploitable advantages and then leads to the increasing use of machinery..

Surprisingly, this scheme can also be applied with regard to the division of intellectual labour: It too first emerged as the organisation of a manufactory, namely that of de Prony, who in turn modelled himself on the organisation of manufactories with physical labour, according to Babbage (1832). Babbage then developed his computer precisely with this division of labour in mind, in that his apparatus could take on all sorts of mental work if it could only be put into a programme that called up the appropriate basic operations in a predetermined sequence. The computer thus interfered as a machine with people's mental work in the same way that the steam engine took over or supported physical power. In the case of mental work, as with de Prony's calculating machine, it is computational, intellectual, planning or even argumentative work. In this respect, the

[2] We add that, according to Marx, an additional step is then necessary for the full development and stabilisation of capitalism, namely that the machine tools with which the machinery is produced must also no longer be produced by hand, but also by the division of labour. This would correspond to the industrial production of the computer and its programming as it takes place today.

use of the computer is the reorganisation of human mental labour so that it can take place under the control and in the interest of capitalism.

On this basis, a Marxist theory of the computer in capitalism can be developed that ties in with the division of intellectual labour, which is conceived as co-operation between the human being and the machine..

Marx (1990, 455) also points out in the chapter on the manufactory that the organisational structure of the division of labour must be in place beforehand so that the machine can then be used. This then also applies to the use of the computer. And, conversely, it means that what the computer takes over from humans in the division of labour could, in principle, also be done by humans within the framework of the same organisation. In practice, this is probably not always feasible, because computers can, for example, carry out a great many activities very precisely and very quickly, which would perhaps keep thousands of people busy for years – *but theoretically, it is clearly not possible to claim without further ado that the programmed computer can solve problems that humans cannot possibly solve*[3]*.*

In this respect, a viable Marxist theory of mental labour and its division between humans and computers can make important contributions to an analysis of digitisation on the technical basis of the computer. However, at present such a theory is not in evidence. After all, the Marxist philosopher Alfred Sohn-Rethel has dealt with related issues in his lifelong work. We have drawn on some of his considerations above, but his approach is much broader and controversial. It will focus on Sohn-Rethel in the next subsection, because at least some things can be learned from his considerations. We will not take a stand in the controversy about his theses here.

3.3. The Approach of Alfred Sohn-Rethel

Sohn-Rethel did deal with intellectual work in a Marxist perspective, but he pursued different goals than the ones we are dealing with here. His work was designed to find out why people who lived and still live in a world of concrete things can nevertheless think abstractly and use abstract concepts. Sohn-Rethel was thus concerned with an epistemological problem that arises from materialism when confronted with Kant's basal categories such as space and time. In his investigations, Sohn-Rethel thus refers in many places to the work of the historian George Thomson (1968), who, among other things, has attempted to reconstruct the emergence of human forms of thought and communication, such as mathematics, on the basis of historical and philosophical investigations.

> ”If Marxism does not succeed in removing the ground from the timeless theory of truth of the dominant scientific doctrines of knowledge, then the abdication of Marxism as a standpoint of thought is a mere question of time“ (Sohn-Rethel 1972, 17). One of Sohn-Rethel's central concepts then is that of ”social synthesis“. By this ”we understand the function(s, F.K) which, in different epochs of history, mediate the 'Daseinssusammenhang' (the main connections of the common existence of mankind, F.K) of human beings into a viable society.“ (Sohn-Rethel 197219).

Thus, Sohn-Rethel can “formulate the basic insight that the socially necessary thought structures of an epoch are in the closest formal connection with the forms of social

[3] This is not to say that computers can always be replaced by humans; at least there are no studies on this. But that computers will someday have the capabilities to eliminate all the evils of this world is probably more of a deification of the machine that goes beyond humanisation.

synthesis of this epoch. Fundamental transformations in social synthesis occur when there is a change in the nature of the actions whose relation to one another sustains the human context of existence, e.g., whether these are productive or consumptive activities in which man is in exchange with nature, or else actions of interpersonal appropriation which take place on the back of such exchanges of nature and have the character of exploitation, even if they take the reciprocal form of commodity exchange." (Sohn-Rethel 1972, 20). "In commodity-producing societies, money constitutes the vehicle of social synthesis and requires for this function certain formal properties of the highest level of abstraction" (Sohn-Rethel 1972, 20). These are based on formal properties abstracting from use-value, and these are what Sohn-Rethel wants to determine in essence. This then gives rise to the socialisation forms of thought, for example, those that Kant described as a priori existent, which then enables Sohn-Rethel to speak of money as „the bare coin of the a priori" (1976:35).

Sohn-Rethel's overall project will not be pursued here. Kratz (1980), for example, has presented Sohn-Rethel's reflections and also partially referenced the discussion around them. His account is critical because Sohn-Rethel also undertakes a revision of some of Marx's considerations that both Kratz and other Marxists do not share. Nevertheless, the question is of course highly relevant for any materialism, how people come to think and speak in categories of space and time and with the help of abstractions and what meaning mathematics has. Because this also questions whether natural science and mathematics today are really universal or just historical. In connection with this, it would also have to be taken into account that mathematics cannot be justified without contradiction even as the basis of what a computer does (Krotz 2022 with further references, see also Heintz 1933)).

Nevertheless, such a theory would of course be helpful in elaborating the meaning of the division of intellectual labour within the metaprocess of digitisation. If it is indeed money and the process of exchange that enable the human capacity for abstract thought, then one could also start today with the question of what will happen to money if digitisation continues – if money exists only as electronic symbols, the use of which, however, is then precisely accessible to companies through data. Then the old ideas that coinage and bills are actually representatives for gold stored in the vaults of the state banks will also no longer be true – today money is rather a variable offer of an overdrawn financial system protected by blockchain technology and thus a speculative object on which even the respective livelihood of the speculators still depends. Who benefits from Bitcoins and the so-called digital euro? For whom is it beneficial when it is no longer the state that provides a stabilised payment system through which people are supposed to transact their forms of reproduction, but can now be expropriated in the process by fraudsters and speculators, thus turning their survival into a coincidence that can no longer be controlled? Whereby it is not yet considered that with the ever faster becoming computers in few years most present safety systems will be levered out. In the following, we will disregard these theoretical questions and turn to an attempt to systematise considerations on digitisation via the division of intellectual labour on the basis of today's state of knowledge by attempting to systematise the role of the computer as an instrument of the division of intellectual labour.

4. Empirical Considerations on a Materialistic Theory of Economic and Social Developments in the Process of Digitalisation

4.1. Intellectual Work in the Context of Human Activity as Forms of Thinking, Acting, Communicating, Perceiving and Interpreting Human Beings

Today's capitalist business management (https://www.bwl-lexikon.de/wiki/arten-der-arbeit/, accessed on 14 August 2023) remains decidedly superficial on such issues. It is said there quite simply that mental work is the result of thinking processes, and that physical work, on the other hand, is performed with the body. But physical work also requires thinking processes, quite apart from the fact that human thinking is also a physical event. In addition, then between dispositive work (which is reserved for the management) and executive work, which takes place directly with the object (Wikipedia (German) Work (betriebswirtschaftlich), accessed on 13. 9. 2023) is differentiated – mental work can be however both dispositive and executive. And it can play a role for the capitalist economy in quite other spheres, because today almost all mental activities of people can be accompanied by computers, even if often only with regard to a protocol of what is observable.

In this respect, following Marx (1990) and the considerations presented so far, we assume here that physical labour concretely consumes energy and transports or transforms matter, while mental labour describes actions that are primarily composed of symbolic operations in given contexts. This includes, for example, thinking processes such as the construction of meaning, but also communication and interpretation processes, steering and control processes, dispositive, planning and ordering activities, dialogues and arguments, also perception and interpretation, analogy and context formation.

Given this diversity, it is difficult to systematically categorise human mental work in terms of computer interventions. Nevertheless, core differences can be taken into consideration.

On the one hand, there are forms of mental work that take place in factories and companies: Organisational and management work, planning and development work, programming work, activities of individuals based on the division of labour, such as the evaluation of data, work with interactive and with automatic programs. In addition, there is control and monitoring work. (This list is probably not complete).

Furthermore, intellectual work does not only take place in the context of factories and production, but as explained, also as activities of various kinds in the context of and outside of professional work. Thus, there is housework, educational work, substitution work, relationship work and care work, and buying and selling as core processes in capitalism that also require mental activities. Even the counting of money and the cutting of coupons by private individuals can be understood as work. Likewise, there is 'paperwork' when one interacts with government agencies or has to do something according to bureaucratic rules.

In an overarching way, then, following the considerations in section 2, it can be said *that mental activities as typically human activities basically include all activities that have to do with the symbolic world of human beings, ultimately all activities that the Animal Symbolicum performs*. This does not deprive Marx's theory of its force, but rather expands it, because Marx, after all, had to concentrate on work in the realm of economics for his purposes. In this respect, at any rate, it is true that a theory of mental labour must be complementary to Marxs theory of physical labour. The difference is that mental labour takes place not only in the sphere of production, but also in the

sphere of consumption, in the context of human relations, and in general in all spheres of human life.

4.2. Forms of Interaction Between the Human Being and the Machine

In the context of digitisation, we are now interested in especially that intellectual work which a computer can perform or in which the machine can participate. If we look at the historical phases of digitisation outlined in section 3.1, in phase 4 capitalism first appropriates the organisation and control of the computer and digitisation, as well as control over the further development of this technology. Since then, computers have become more and more by number, the interconnections more and more diverse, the software more and more complex and also more error-prone, and all this happens under the control of the digital companies, behind which the entire economy stands with its interests.

For this reason, a fundamental distinction must be made between two cases:

- Either a computer controls a mechanical machine that it can simulate – this is possible according to Turing (2002), as explained earlier. This is the case, for example, when robots on the assembly line intervene in the production process and are programmed to do exactly that.
- Or people are directly affected by the operations of the computer in some way – for example, when a self-driving car encounters other cars controlled by humans or pedestrians are in the vicinity. Or when someone plays chess or an MMORPG with a computer, or a computer as a drone and independently of further human intervention drops bombs on a human. In the case of a chess game, the human involved then has only a few, well-defined options of what to do. In the other cases, the human may have numerous options available to him, which the programmer can by no means always foresee or take into account. This is also true, for example, of an exchange of words between a human and a machine staged as a dialogue, and also of a self-driving car, when the programmer programs a car to drive in Switzerland but then sells it to India with quite other driving options.

Therefore, in most cases of human-machine operations, machine activities will be problematic and in many cases will end badly when the computer controls them, reduced to the options the programmer has taken into consideration. This is because such programmes are usually created under the control of companies that must pursue their own interests under penalty of bankruptcy and, if only for reasons of cost or lack of experience, do not then consider all possibilities. For example, a diagnostic computer may only ever suggest treatments with drugs that a pharmaceutical company has paid the programmer to name. It is such facts that can lead to racism and evil dilemmas, to death and disease. This is all the more true when it comes to programmes that control information.

But it is also important to keep in mind that computers operate in their own way, which differs from humans in the way they act, as we pointed out in section 2. This is most obvious in activities such as social action and understanding by humans, which computers do not control and cannot account for. *Consequently, computers can by no means replace or support humans in all their activities.* The transformation that the computer sets in motion in such cases can then fundamentally change the areas of human activity, but also at the same time restrict or otherwise ruin them in some way. This is true, for example, of people's social relationships, which have been substantially transformed by Facebook, Tinder, TikTok and other computer-based forms of organisation. And it also applies, for example, to politics, which faces major problems due to new forms of self-expression and the participation of many or more and more

individual participants, as well as a changing political public sphere – hate speech and fake news are ubiquitous. this is also because of the lack of a control tool of the individual, which is important in terms of speech. Those who speak listen to themselves, but those who write don't need to read the filth they've written if they post it right away. But there are also cases like Twitter, which the new owner is currently transforming into a socially harmful instrument.

All in all, then, it must be stated that a computer is competent for dealing with machines, but not for dealing with people. This was already shown by the example above, according to which computers should learn empathy. Nevertheless, computers are increasingly used for such tasks, whereby they often have a residual function stored in them – whenever a computer does not get along with a human client, there is by institution not the possibility that a human is called in, but the computer use his residual form and does not longer care about the human client. It is convenient for the company that the computer has no morals and no consciousness and that it does not know what it is doing. It then easily overrides what one could call the insubordination of consumers and customers. In this respect, regulation would have to ensure that human-machine interactions always have a functioning human-human redirection that is accessible to all.

4.3. Companies and Their Instruments and Resources: Datafication and So-called Artificial Intelligence (AI)

Complementary to the forms of human action, it is necessary to look at how companies deal with computers and digitalisation and thus with the division of intellectual labour. It is clear that companies are using digitalisation to optimise interactions for their business purposes. This then inevitably creates new difficult forms of work for the workers who remain – they are replaced, more controlled, pushed into different kinds of jobs, which can then often lead to their work becoming dehumanising and their skills deskilled. Just think of de Prony's adders, who had to perform the same arithmetic step two hundred thousand times.

This also brings to the fore phases 5 and 6 of digitalisation, in which companies have further developed digitalisation in a direction that benefits their interests and above all these interests, but is often used at the same time at the expense of their employees, and also at the expense of human rights and democracy. Here, the collection of all data which exist, is meant. In this regard, we refer to writings by Hofstetter (2018) and Zuboff (2018, 2019).

In a text concerned with the question of the further development of capitalism, however, one must emphasise a further consideration: Unlimited datafication forms a crucial basis for expanding and securing the domination of the capitalist economy. For through it they control their customers, whom they can describe and influence. Moreover, *it enables them to optimise the planning of their products and their design, and thus to be comparatively sure that they will make a profit and not go broke.* For this reason, the bon mot has long been widespread among the population about what one should probably do when Amazon recommends to its customers just the books and media that are already on their bedside table.

It can therefore be said that companies today also control the consumption and buying behaviour of their potential customers in a new way, insofar as they can influence them far better than before only through advertising and marketing activities. *To that extent, they can use it to gear their production planning to them*. This is not only a powerful instrument for sales, but also an instrument for optimising production, and thus altogether a step towards a new capitalism that can now control not only

production and trade, but also purchasing and often also using behaviour. This is the first reason why we must speak of a qualitatively expanded capitalism in connection with digitisation: Production can no longer be adapted to what is merely predicted by experience; planning is based on diverse and precise data about what will be sold.

It is true that it can be argued that computers only have access to human behavioural data because they do not understand humans, but can only address them as reactive beings by means of stimuli. However, computer programmes have numerous possibilities to induce people to behave in certain ways at the stimulus-response level – for example, through the manipulative form of nudging (Thaler and Sunstein 2009). Therefore, as a supplement, one must probably also assume that people living in a fully digitalised capitalist society will unlearn many of their typical human characteristics because they are no longer needed. Their role in a capitalist economy will be reduced to stimulus-response behaviour. This would be a decidedly problematic process, however.

A second reason why one must speak of a qualitatively new capitalism lies in the potential of digital automation, which is now available to companies under the title of artificial intelligence. *This is because so-called AI operates primarily on the basis of behaviours that can be increasingly predicted on the basis of companies' data stores; it operates without further human intervention as a form of automation.*

So-called AI programmes, as explained above, are nothing more than more or less complex programme sequences of simple orders that run in an automated fashion when the apparatus interacts with humans. The latter, when they search for something or have something to do and encounter AI programems in the process, have to adapt to the corresponding specifications of these machines.

Conversely, it is always said that computers can learn, but it is not said what learning exactly means. A closer analysis shows that *instead of learning, the term of dressage more or less aimed at desired successes would be more appropriate*. The so-called computer learning, the so-called neuronal learning and the impressively so-called deep learning always take place on the basis of collected data stocks and thus always on the basis of behavioural data of observed computer users, as it is well known. As a dressage on stimulus-response level, computer learning in all its forms has nothing to do with human learning. This is especially shown by the analysis of such programs (Nguyen/Zeigermann 2018, Flasinski 2016, Ertel 2017)).

In supervised learning, which mostly involves categorising individual cases, the trainer knows which results produced by the computer belong where and can then provide positive or negative feedback. In the case of non-supervised learning, a so-called AI independently forms clusters of matching data. However, it remains uncertain whether this will ultimately produce something that the client can use. If not, however, the approach can be modified; in this respect, as in the case of cluster analyses, this is ultimately also a procedure adapted or radically simplified to expected results so that the necessary computational procedures function as expected (cf. e.g. Nguyen/Zeigermann 2018, 105ff.). Finally, there is s*o-called reinforcement learning,* in which the AI is also supposed to learn without specifications, but is steered in a certain direction by rewarding certain results. All of these methods allow for a variety of simplifying or adapting interventions by the programmers that can influence the outcome. In this respect, one cannot claim that computers arrive at results independently of biases or interests. All these procedures depend not only on the programming, but on the possibly used data and the manipulations of the programmers to get useful results. It is obvious that regulation is necessary here.

Ultimately, these problems are due to the fact that the computer, as noted above, must face reality as a stimulus-response apparatus controlled by digital enterprises, because it does not understand what it is doing. Therefore, the underlying learning concepts are borrowed from behaviourism. In this science discipline, by learning always conditioning processes are meant, such as those developed by Pavlov in his famous dog experiments: The dog learned not to produce bodily fluids like saliva only when it saw food, but already when a just "learned" sound announced it. Following this, the behaviourist social psychologist Donald Hebb (1973), who also developed the basics for the so-called neuronal learning in the brain and is therefore often quoted by computer scientists, criticises the concept of learning as too general. Although he admits that a reduction of all learning processes to conditioning processes is "an oversimplification" (Hebb 1973, 205), ultimately this is the only form of learning that a behaviourist can investigate and thus understand as learning.

Supplementary, one can say that neural learning of computers as a special case of computer learning, also goes back to a thesis of the behaviourist psychologist Hebb, who then simply explained the functioning of the interconnections of neurons observable in the human brain in a behaviourist way and represented their functioning by a linear system of equations – the neurons react to stimulation and learning processes in the brain can be adequately represented by adaptations of the weights in these linear equations, so the conclusion. Why this should be so remains obscure. Even if this can be correct for neurons – the human brain functions differently in any case, because human learning processes do not simply end in a neuron layer, but are anchored in insights and can be reflected – the results can manifest themselves in human consciousness. Today's psychology is also further along in this regard.

In all of this, we see that digital companies and those who are also trying to be, can achieve useful results through such programming, which can be helpful to them. At the same time, humans will become increasingly unimportant in the sense of anthropomorphisation, also with regard to their own decisions: Technology is simply better in principle, it is said in an ideologically blinded way. In this context, Mayer-Schönberger/Cukier write sweepingly: "The biggest impact of big data will be that data driven decisions are poised to augment or overrule human judgment", and go on to say that "statistical analyses force people to reconsider their instincts. Through big data, this becomes even more essential" (Mayer-Schönberger/Cukier 2013, 141).

Thus, it becomes clear here again that AI programmes, on the one hand, are intended to take influence away from people and, on the other hand, are used primarily because they function without further human support – *they signify the step of digitisation into automation.* Humans have to adapt to all this because they increasingly encounter such automatic programs, which they can or must deal with for a variety of reasons. Conversely, institutions and companies protect themselves against insubordination on the part of their customers or all those who fob them off with such automations. Ultimately, this creates a society in which people are individualised and altogether powerless in the face of the automata on the Net or on the telephone, because they are increasingly surrounded by such automatically running programmes. The empathy that computers are supposed to learn is then supposed to help people experience this dependency less clearly. This is the corporate power that thus emerges, and must be seen as the second reason why the capitalism of the future is a qualitatively improved one compared to that of the past.

4.4. New Forms of Work for People Based on Digitalisation

The fact that a number of new forms of work have meanwhile developed that point to new forms of capitalist exploitation is now increasingly reflected in literature and empirical studies.

These include t*he so-called gig economy and the so-called coworking forms.* One of the best-known "places on the net" where such forms of work are mediated is Amazon's "Mechanical Turk" platform, the name of which is probably intended to indicate that here, too, behind the apparently great technology there are people who have to add what the machine cannot. Such platforms offer jobs to people familiar with computers, which digital companies advertise because they rely on such support (see de Ruyter et al. 2018/2019). For example, hundreds of thousands of people observed traffic conditions in their neighbourhoods for a few euros so that navigation systems could incorporate up-to-date data. Other jobs relate to image recognition, which computers cannot reliably do. The pay is usually lousy (Bonse 2002), and the working conditions nasty and contrary to human rights (Moreschi, Pereira, and Cozman 2020). The emerging new capitalism has not unlearned the old forms of exploitation.

Other jobs of a new kind, as we know, then consist of actually well-educated people in the Global South having to evaluate images that are to be posted on Twitter, Facebook, and other platforms, but may violate legal rules. Such jobs then consist of judging endless sequences of images from the realm of violence and more or less violent sexuality in *a Tayloristic setting – a job that can break people.* Other examples include computer gamers who, as participants in computer games, do not play but work. They aim to gain certain attributes and symbolic objects that they sell to richer and less skilled players, who in turn can boast about them.

5. And the Society of the Future?

Digitalisation is increasingly leading to an ever more comprehensive takeover of people's forms of intellectual work by computers. Computers, software, networks, data, and AI almost always serve the interests of digital companies and the economy behind them, and contribute to the fact that more and more areas of people's everyday lives and society are becoming accessible to the interests of digital companies. People must increasingly adapt to this, also because more and more relevant forms of action are being triggered by digital operations, the hegemonic demands of which fewer and fewer people can avoid and which cannot be changed individually, however – medicine, social relationships, mobility, knowledge and learning, etc. are being embedded in capitalism in new ways. It is also hard to resist or avoid the manipulations that are possible in this way, given their massive spread. The problems associated with capitalist control over digitalisation have been elaborated here.

As a thesis, then, it can be stated that, with the digital industry, a newly powerful sector with often ignorant and power-conscious new elites with no interests in democracy, only in technology, is pushing its way between people and their ways of life and society and its forms of function. Behind it, the traditional economy is already waiting to take over the profitable operations of the digital pioneers. In this respect, it is to be expected that capitalism will experience an upswing as a result of digitalisation and that a qualitatively expanded capitalism will come about.

For just as the sphere of production has been capitalistically organised and controlled up to now, the spheres of consumption, reproduction, distribution, but also the spheres of people's lives and their culture, which were previously only indirectly controlled, will be controlled in a new way and directly via computers and digital networks by the big companies and instrumentalised for their interests. Until now, it was the

threat of bankruptcy and leaving the markets that the capitalists fought against; meanwhile, they have data and forms of automation at their disposal to avoid this threat and to directly subject people to these interests in all their spheres of life. The aim to exclude the insubordination of the workers is of course still remaining.

The relations of production are changing on the basis of the changing productive forces, namely the "steam engine of the mind". As a result, capitalism creates the society it needs. Thus. the announcement of the one-dimensional human being by Herbert Marcuse (1970) gets a new meaning, because in the process of digitalisation the human being is moreover shortened to a stimulus-response being. And also the manifold indirect hegemonic consequences of the previous capitalism, which Adorno and Horkheimer, Lukács, Fromm, and Marcuse, in a certain sense also Bourdieu and the actually democratic feminism have described, are changing – if capitalism had only indirect access to society so far, it is becoming more and more direct and immediate with the help of digitalisation. The fact that there are also inherent contradictions, which arise not least from competition and greed, but which are also structurally inherent because, for example, humans are not stimulus-response systems, should not be forgotten.

What to do? We emphasise once again that a different digitalisation is possible, one that serves humanity and not capitalism. The mentioned problems are not a consequence of the computer, but a consequence of the capitalistic use of the computer. A sophisticated theory of intellectual work could reveal many open possible fronts. Perhaps the thesis of the historian Ivan Illich that humankind should not use techniques that humankind does not understand and that endanger democracy (Illich 1975) is also valid. Especially the ideology of anthropomorphisation would have to be criticised in science and public. Capitalism has dominated the world for centuries. Today it also threatens the world in a new way via climate crisis and destruction of the bases of natural life. The necessary change becomes obvious for more and more people.

Perhaps there is a chance to link the fight against these threats to a radical restriction of capitalism. We all have to get involved.

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Capital is Dead. Long Live Capital! A Political Marxist Analysis of Digital Capitalism and Infrastructure

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Abstract: There is a growing literature suggesting that the digital economy is taking us out of capitalism. While this manifests most notably as a diagnosis of 'digital feudalism' or 'techno-feudalism', a differing voice is McKenzie Wark, who suggests we have entered an entirely new mode of production altogether: "vectoralism". This paper historicises and theorises our current conjuncture in relation to the potential multiplicity of modes of production, and the materiality and imperialism of telecommunication infrastructures. We approve of Wark's development of new concepts, rather than turning to ahistorical regurgitations like "neo-feudalism". However, we argue that the mode of production lens is not adequate to trace what we consider as more granular changes and that it risks packaging old wine in new bottles. For example, Wark's vectoral claims remain grounded in infrastructures such as undersea cables that are used by corporations and states as strategies of legal and economic imperialism reminiscent of the 19th-century world order. Instead of examining this topic through a mode of production lens, we contend that these phenomena are better traced through a processual (rather than functional) and socially determined (rather than economically determined) method of historical materialism. In this regard, we adopt an approach closer to that of Thompson and Political Marxists, such as Brenner and Wood. To support our argument, we turn to wider Marxist theory on the mode of production, which we then anchor in empirical works from contemporary critical infrastructure and communication studies.

Keywords: digital capitalism, infrastructure, mode of production, vectoralism, McKenzie Wark, imperialism, political Marxism

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In *Capital is Dead: Is this Something Worse?* McKenzie Wark (2019) argues that we are no longer in capitalism. Instead, the ascent of the digital is held to have enabled the birth of a new mode of production entirely: vectoralism. While capitalism remains, it is being outpaced by this emergent configuration, with its faster, more intensive modes of extraction. In place of conflict between capitalist and worker, Wark argues that the world is increasingly divided between a class of "vectoralists", those who control information and the infrastructure through which it flows, and those who produce information, a class of "hackers".

We applaud Wark for returning to the fundamentals of political economy and for seeking to refine our conceptual vocabularies. It is undeniable that 'digital capitalism'

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has brought forth fundamental changes to the global political economy which necessitates innovative scholarly inquiry (Schiller 1999; Durand 2020). The challenge of theorising an emergent alternative mode of production has recently been raised by both the political left and right (Zuboff 2019; Kotkin 2020). We thus consider it imperative for the left to engage seriously with such provocations and not to surrender the debate to the political agendas of reactionary authors (see Smith and Burrows 2021; Morozov 2022, 89-90). Amongst the various proposals of such a new mode of production, we find Wark's submission uniquely stimulating in that it is based on the development of a new conceptual register, rather than retreating to ahistorical regurgitations such as "neo-feudalism" (Mazzucato 2021; Varoufakis 2021).

Yet, despite being stirred by Wark's polemic, in this paper, we identify limitations in her argument. We show that using the method of a mode of production framework defeats the purpose of assessing granular social change, Wark's apparent aim. This is partly because the mode of production concept is better suited for examining large-scale changes (Haldon 2015) and has historically been developed to facilitate an *a posteriori* reading of periodical change (Banaji 2010). Having explored the methodological limitations of Wark's reliance on 'mode of production', we then turn our analysis to the 'new' geopolitical infrastructures upon which Wark's substantive claim is based. We argue that the 'new' class antagonism, which Wark purports, between "vectoralist" and "hacker" (2019, 13), is insufficiently diagnosed especially in terms of the horizontal relations between the ruling class, i.e., states and Big Tech. We, therefore, argue it is premature to suggest that recent socio-technical developments have reshaped the forces of production and the dominant class struggle driving the mode of production. In short, we contend we are still in capitalism, albeit one inflected with digital currents.

While disagreeing with Wark's substantive claims, we remain enamoured with her focus and imagination. Our claim is not that we should ignore her provocation or the topic on which she focuses upon how the ascent of the digital has fundamentally transformed the global political economy. However, instead of examining this through a mode of production lens, we contend that such changes are better traced through a processual (rather than functional) and socially determined (rather than economically determined) method of historical materialism. In this regard, we adopt an approach closer to that of E. P. Thompson (1995) and Political Marxism (Brenner 1977; Wood 1995).

In particular, we argue that Wark's use of *modes* of production in the plural as co-existing and overlapping is misplaced. Instead, in keeping with Fraser and Jaeggi (2018) we suggest that the changes in forces of production that Wark is referring to are instead better understood as more granular changes and 'back stories' of capitalism (e.g., rent extraction, imperialist rivalries), i.e., non-capitalist elements structurally integrated into capitalism. In effect, where Wark sees new vectors, we see old strategies of legal imperialism and geopolitical accumulation. To evidence this point in the context of digital capitalism we draw on Political Marxism (Brenner 1977; Moreno Zacarés, forthcoming), Critical Communication (Aouragh et al. 2020) and Infrastructure Studies (Easterling 2016), underscoring the continued importance of invisible and indirect infrastructures as part of global capital accumulation.

Our paper is structured in three parts. We start by sympathetically introducing Wark's argument (I). Next, we problematise Wark's use of the concept of mode of production as a method (II). Finally, we provide an empirically rooted rejection of Wark's arguments by assessing developments in the materiality of logistics and infrastructures (e.g., undersea cables), upon which the purported vectoralist class depend (III).

1. Examining the 'New' Forces of Production

For Wark, "[m]odes of production are multiple and overlapping" (2019, 14). Her central submission is that a new mode of production, vectoralism, is emerging and is rapidly becoming dominant. For now, the urgent task is to make sense of vectoralism's co-existence with capitalism and to accept that we live in a transitional phase where we should no longer understand capitalism as a totalising mode of exploitation.

Wark's argument is also about method. Since we are now in a new system dominated by the Vector, we also need a new vocabulary, a new vulgar and rude theory to make sense of this new mode of production (52). In other words, the social theories at our disposal that emerged out of the critique of capitalism are *dépassé*. Our conceptual register is outmoded, we have "got stuck trying to explain all emerging phenomena as if they were always expressions of the same eternal essence of Capital" (12).

In Marxist theory, a mode of production is constituted of *forces* and *relations* of production. For Haldon, forces refer to "the means of production and the technical levels or methods of production (including the labour process)" whereas "relations of production refers to how the means of production (land, tools, livestock, etc.) are effectively controlled, and by whom; and how the direct producers are associated with those means of production and with their own labour power" (2015, 209). Wark reproduces Marx's 1859 *Preface to a Contribution to the Critique of Political Economy* by adapting it slightly to integrate the shift to vectoralism (2019, 36-37). For example, instead of "epochs marking progress in the economic development of society" (Marx 1859), Wark defines successive modes of production as "epochs marking the extension of the exploitation of nature by social-technical forms of increasing abstraction" (2019, 37). *Capital is Dead* is therefore an appeal for a better consideration of *forces* of production in Marxist literature (53). The text from Marx upon which this analysis is based is famous, but it has also been abandoned by many Marxists, as the relation it sets between base and superstructure is considered arbitrary and limiting (Wood 2002a; Brenner in Brenner and Harman 2006; Banaji 2010). Wark's rephrasing of this text is an appeal to embrace this so-called vulgarity and return to what she sees as the core of Marx's originality, i.e., Marx's ability to understand his age as a new epoch of history.

The key throughout *Capital is Dead* is information, which accordingly is a force of production that behaves differently from the commodity form (42). It is not scarce, it takes on the appearance of being free, it is cheap to store and transmit, and it requires "transnational legal enforcement" through intellectual property law (42). The latter "becomes a new kind of relation of production, more abstract than its predecessors, and one that makes no land or physical plant, but rather information itself, a form of private property" (42). This produces, as the thought experiment goes, a new class relation, the "hacker" vs the "vectoralist", in which the hacker makes new information (43), and the vectoralist owns and controls the vector, "the infrastructure on which information is routed" (45).

So, according to Wark, information is the new force of production and a key source of revenue. Information is transferred through infrastructure, which is owned and controlled by vectoralists, who are framed and supported by an intellectual property regime (superstructure) that allies them to the state (superstructure) and produces a new relation of production. This in turn generates a new form of private property and legal form owned by individuals, especially hackers, whose labour has become the production, or reproduction, of information. This is the basis of the surplus wealth extracted by vectoralists.

Due to a political economy based on the "excess of information" (5), the new vectoralist-hacker class struggle is bifurcating from the capitalist-worker class struggle "out

of the development of the forces of production, which generated an extensive and intensive rationalization – or better yet, *abstraction* – of the production of information" (88). Finding ways of further abstracting the production of information through the controlling, owning, and extracting of information is the vectoralist class's objective. Discussing technological changes in terms of forces of production allows Wark to integrate them into a class analysis without falling into a crude technological determinism. Class analysis helps to enable the argument that there is a new form of exploitation here, and thus competing forms of exploitation at play, as capitalists continue to operate alongside vectoralists (although how exactly remains unclear in the text, as we discuss below). In any case, both are fetters on the forces of production.

This begs the question: how is information today different to any other commodity under capitalism? Aside from its innovative specificities and the fact that it is not constrained by scarcity, the qualitative difference is difficult to grasp (Fuchs 2013; Rigi 2014; Dantas 2017; Fuchs 2017). In a capitalist mode of production, the forces and relations of production operate according to a systematic and conflictual relation set in place between a capitalist class that owns the means of production and a working class that can sell its labour power (Brenner 1977). Wark may argue that the vectoralists do not own the means of production anymore, because those means, or forces, have changed and have become information itself, but they own the infrastructure that it requires, so how important is that degree of separation of ownership? Wark's response is:

> The vectoral infrastructure throws all of the world into the engine of commodification, meanwhile modifying the commodity form itself. There is nothing that can't be tagged and captured through information about it and considered a variable in the simulations that drive resource extraction and processing (2019, 48).

Since we have "run out of world to commodify", "commodification can only cannibalize its own means of existence" (48). The Vector eats our brain, whereas Capital eats our body (59). But for Fraser (2022), for example, this cannibalism in itself is a specific feature of capitalism today, and it does not matter what capitalism eats. The qualitative difference for Wark seems to be that vectoral infrastructure enables more "extensive" and "intensive" abstraction of any social process, as it pushes the boundaries of commodification into a limitless field of extraction.

The vectoralist class exploits the asymmetry of information, i.e., "the asymmetry between the little you know and the aggregate it knows – an aggregate it collects based on the information you were obliged to 'volunteer'" (55). What exactly the hacker class does, for Wark, is not labour as we know it, "as it's not the same thing every day" (51). There are several ways in which information is a so-called new and qualitatively different force of production, whose extraction requires a new property relation: how the information is processed through vectors, the main task it requires i.e. creation, how it affects our brains more than our bodies, and how it relates to the broader aggregate of forces. The vectoralists own "the *extensive* vectors of communication", the "*intensive* vectors of computation", the "copyrights", "patents", "trademarks", "logistic systems", "financial instruments" and "algorithms" (55), all more 'abstract, flexible, adaptive' (56).

A key question emerges as to whether these relations of production equate to a process of rent extraction (Moreno Zacarés 2021, 61-62). Wark acknowledges in one passage the closer link between landlords and vectoralists, as they "may benefit from the rise of the vector in ways Capital does not"; "landlords (often with global property

portfolios) increase their rents by extracting the information value that the presence of the hacker class produces" (2019, 92). This would seem to imply that Wark would refrain from qualifying all vectoralist/hacker relations as equivalent to rent extraction. However, today's economy is characterised by stagnation, which is emboldening rentierism through the dominance of intellectual monopolies, shifting the economy into relying on new forms of growth (Durand 2022; Rikap 2023), new means of securing growth (Christophers 2020; Benanav 2020), and new alliances with state actors (Brenner and Riley 2023). According to these analyses, and Wark, we are seeing a (re)turn towards extra-economic forms of exploitation.

2. The Mode of Production Debate and the Problem of Multiplicity

The Marxist emphasis on mode of production emerges from Marx's more mature and unfinished works: *Capital Volume One* (1990), the *Grundrisse* (1973), and *Volumes Two* and *Three* of *Capital* (1978; 1981). The mode of production refers to capitalism's *laws of motion*, i.e., how wage labour and capital come together systematically in a way that makes them imperative for social reproduction to occur. Althusser and Balibar (2009) have provided key formulations of the concept and its importance for historical materialism. However, their more structuralist position is also disputed, most famously by Thompson (1995). Debates around its use and definition have shaped Marxist theory (Banaji 2010; Campling 2013). Althusser (2009) emphasised the distinction between forces and relations of production in terms of their economic contradictions, whereas Thompson (1963), Banaji (2010) and Political Marxists (Wood 2002a) tend to focus more on historicising those concepts and defining capitalism as a *social ensemble of relations of production*. Political Marxists will even go as far as abandoning the forces and relations distinction and starting instead from the concept of social-property relations (Brenner 1977).

The mode of production debate can also be translated as a problem of "levels of analysis" (Bernstein 2013, 327). We suggest here that Wark's provocation is to think of the mode of production in terms of co-existence and multiplicity. As noted above, what the forces of production today reveal, for Wark, is a multiplicity of forms and classes of exploitation.

Using a mode of production framework as a thought experiment to capture ongoing change, i.e. as a potentiality, will seem surprising to those who reject the concept of the mode of production (Knafo and Teschke 2020). In effect, "getting stuck" is exactly what they think the mode of production does, i.e., the abstraction serves to reify a functionalist framework for understanding capitalism (Post 2013; Gerstenberger 2021). Either Wark is developing an approach to the mode of production which does away with the charge of functional derivation, by arguing that through a lens of multiplicity, one can avoid being functionally derived from a single chain of causality; or she is misguided as to how the concept of mode of production operates, thus weakening her argument for multiplicity. By her own admission, she suggests that "it is as hard to describe transitions between modes of production as it is to describe changes in mood" (22). Indeed, if the mode of production is compared to one's affective disposition, without the Spinozist framework from which it could potentially gain (Lordon 2014), we suggest it is doing more harm than good to Wark's enquiry.

We agree with Wark that new social relations require new methods, that Marxist concepts are not transhistorical blueprints, and that significant changes are happening to the global political economy justifying debates about large-scale transition (Fuchs 2013). However, adopting the concept of mode of production is not an innocent choice in method (Fuchs 2019). In fact, choosing to frame a new poetry and matrix of class

relations according to the multiplicity of modes of production has significant disadvantages for understanding transition. We argue that it ignores the methodological specificity of the concept in describing a unique phenomenon, and thus stifles analysis of change by falsely reproducing the role of certain processes. In the next section, we substantiate this claim through a historical analysis of the geopolitics of empire and extraterritoriality for understanding infrastructures.

Regarding the specificity, exclusivity, and singularity of the capitalist mode of production, the nature of capitalist laws of motion – or rules for reproduction (Brenner 1986) – is precisely to expand and reproduce themselves *ad infinitum*, because of the logic of accumulation and competition (Marx 1990). The capitalist mode of production, which has allowed us to think of such a concept, is unique for the specific reason that it is a *totalising system* that requires systematic and imperative conditions for productivity through the extraction of relative surplus value out of the real subsumption of the labour process (Brenner 1977). However, the controversy is inevitable, as the concept of mode of production is undoubtedly underdeveloped by Marx, and was subject to decades of positivist materialist interpretations during the Stalinist years, at variance with Marx's method of historical enquiry (Banaji 2010, 46-47). However, it seems incoherent, if one adopts an orthodox conception of the mode of production, based on capitalism as a *totalising* force as set out by Marx, to assume different modes co-exist (Banaji 2010, 52-66). As such, if there is co-existence, then we are not in a capitalist mode of production. Banaji distinguishes between two definitions of the mode of production in Marx, one at a simple or low level of abstraction, based on the labour process; and the other at a higher level of abstraction and referring to an "epoch of production" (2010, 50). Moreover, wage labour can be used as a simple category and used across different modes of production, or it can be used as a concrete category at a deeper level of abstraction and is only in this instance capital-creating or capital-positing and thus value-producing (Banaji 2010, 54). These categories are often confused in the literature, he argues, which amalgamates relations of production and modes of production, or relations of production and forms of exploitation. In other words, discussions that misuse the notion of mode of production tend to mistake the *quantitative* growth of the category of labour and its correlative forms of exploitation for *qualitative* growth, implying a shift in "epoch". Because it is a higher level of abstraction, the mode of production as an epoch, as qualitative change, is "impossible to determine until these laws of motion are themselves determined" (60); until after it has happened. In other words, to describe an ongoing change of epoch, that change needs to be complete, and not overlapping. The owl of Minerva only flies at dusk for the Marxist analysing the mode of production.

The mode of production is also just a clunky concept. It is limited and limiting by its nature; it fixes an epoch and a set of forces and relations of production in space and time (Haldon 2015, 207-211). It is a heuristic device, which enables subsequent slicing of social formations, and the possibility of deeper immanent analysis by synchronically stopping the movement and potentiality of history. In some ways, it is the antithesis of change and historical materialism in that it fixes a continuity outside its actual development, abstracted out of its laws of motion. Instead, ruptures and breakthroughs, which occur through class struggle, are not just a challenge to the mode of production, but proof that it is merely an abstraction that compromises the actual movement of history. Even for Haldon, a prominent user of the concept, mode of production "has a value only at a relatively high degree of abstraction, functioning as a means of differentiating at the level of political economy some very basic differences in how surplus wealth is generated and appropriated. Trying to formulate laws of motion beyond this level" or

"in respect of organisational capacities and arrangements" is "misleading" (Haldon 2015, 207-208; see Bernstein 2013, 327).

In terms of how Wark applies the concept, she may indeed be focusing on how surplus wealth is generated and appropriated, but to evidence that claim, she relies more on changes in labour and exploitation as simple categories and as organisational capacities and arrangements. She seems to adopt the view, described by Haldon (2015, 213), that a mode of production can be superseded by a quantitative growth of the forces of production (i.e., the excess of information), which eventually leads to a qualitative shift; that commodification now means "the appearance of a world of information *about* things" (Wark 2019, 15) and to a conflict with previous relations of production. Yet, surplus wealth remains generated and appropriated through control over the labour process, however much its daily routine has shifted – the fact that this exploitation of labour is shaped by information as the new El Dorado can merely be seen as a question of organisational capacity and arrangement.

Considering Haldon's cautionary remarks about the limits of the concept and its use as a historical method, the mode of production may not be at all useful as a heuristic device to understand what is coming *next*, or to contemplate whether we are no longer in capitalism. Wark would possibly answer that she is not a historian in the sense of working from the past towards the present and instead stresses that she wants to do things "the other way around", to "first describe the present, then secondarily figure out where it came from" (35). Since the mode of production is a concept that was elaborated only at the end of a long process of analysis of the present (i.e., by the mature Marx) and to roughly differentiate societies in the past from what was happening in the 19th century, this seems like quite a contortion. Also, it does reveal a rather teleological and categorically limited notion of historical method – any historian, Marxist or not, would probably agree to be working from the present one way or another (Hill 1972, 15).

Using the concept of mode of production for ancient, feudal, or other past societies, is controversial (da Graca and Zingarelli 2015), and arguably some of Marx's weakest work is on the differences he sketches between ancient, tribal, and feudal modes of production, and other categories he and Engels later dropped (see Marx 1859). As Banaji has argued we risk, with the mode of production concept, 'reading history backwards' and turning it into propaganda (2011, 65-66). Yet, reading history from present to past is exactly what Wark wants to do, and thus it is difficult to take her work as anything other than a propagandist-poetic provocation.

A similar critique could be made regarding recent "techno-feudal" arguments (Durand 2022; Rikap 2023; Ström 2022), which are consistent with Wark's analysis in terms of substantive changes to surplus wealth extraction. Despite the reality of what they identify (the dominance of intellectual monopolies and the role of technology in securing and expanding new forms of extraction based on rent), the leap that these are "feudal" remains mostly propagandist. Intellectual monopolies are said to dominate today's information age through technology-driven competition as a response to general industrial stagnation (Brenner 2002). They show that we are in a rentierist data-driven economy that echoes how we have described aspects of feudalism, where the tech giants, controlling intellectual property, patents, knowledge-driven technologies, branding, data mining, etc. are compared to feudal lords collecting dues and taxes through personal bondage and control of territory (see Brenner 1976). According to this logic, one could link the vector to the feudal manor. Interestingly, the tech giants are also often compared to early modern joint-stock companies (Wark 2019: 42), while

retaining the so-called “feudal” mode of production framing, even though these companies did not operate in a feudal but mercantilist system. Thus, without being able to dig too deep here, it is fair to suggest that this literature makes largely rhetorical, if not propagandist, use of historical comparisons, and abuses the concept of mode of production.

The more radical historicists of the Political Marxists, refuse to adopt the vocabulary of a mode of production precisely to be able to map better the potentiality for, and granularity of, social change. Generally, Political Marxism emerged as a critique of Althusserian Marxism that posited a more economistic and structural approach to the mode of production, less sensitive to historical specificity (Brenner 1977). More recently, some Political Marxists argue that even Brenner’s concept of rules for reproduction (1986), as an alternative to the concept of mode of production, over-emphasises production and pushes forward a functionalist and derivative approach to social change and to the logic of capital that tends to reify any potential transformations as necessarily capitalist and thus obscure and disable a more historicist approach to agency (Knafo and Teschke 2020, 24).

For Knafo and Teschke, using the mode of production or similar concepts such as “rules for reproduction” or “laws of motion” equates to “[a]bstracting out a small set of rules that derive from under-defined sets of property relations, elevating these syncretistically to epoch-defining concepts – ideal-types – that are meant to capture general patterns over centuries, and vaguely subsuming spatio-temporal specificities under their encompassing explanatory pretences” (2021, 252). In other words, if one is trying to trace significant, but potentially still latent and evolving changes to the fundamental forces and relations of production, such as Wark is, it might be more judicious to frame the analysis more openly through a methodology that does not presuppose a major ideal-type pattern of those relations and forces, but instead focuses on the specific practices that constitute significant changes in overall patterns and continuities.

For Fuchs (2019, 10-11), Althusserians are indeed guilty of collapsing mode of production with social formation. Fuchs (2019, 9) argues that the Althusserian conception of the mode of production overemphasises the economic dimension of production and “does not give attention to how structures need to be produced and constantly reproduced through human practices”, such as communication. Fuchs argues for a more social Thompsonite approach to base a critical theory of communication, as communication “is the everyday process that establishes and maintains social relations” and is in form and content a “material practice” (Fuchs 2019, 16). This implies again a tension, if not a methodological contradiction, between identifying new communication practices by “hackers” and “vectoralists” as defining of a new mode of production.

It is perfectly possible to have a conversation about systemic changes to surplus wealth and property relations without using the mode of production. Although Wark is far less guilty of problematic feudal comparisons, she remains tied to a periodised approach to historical materialism, which provides a framework from which certain potential changes are subsumed and derived, before fully examining the different impacts and manifestations of those practices. Wark’s bravado style of “let’s make up our own Marxist analysis!”, in the sense of using old Marxist concepts but in a new way for our new sets of problems, is alluring and coherent with her definition of Marxism as subjecting “the language of the times to its own critical pressure” (2019, 81). But it remains hollow and rushed if it does not methodologically go through the range of more invisible, or mute, compulsions of capital, which we discuss next.

3. Infrastructures and Geopolitical Imperial Rivalries: Old Wine in New Bottles

To go beyond the methodological argument, we discuss below practices associated with contemporary logistics and infrastructure and their lineages to 19th-century extraterritoriality as an indirect colonial strategy for the capitalist management of territory. We argue that the ownership of infrastructures as a means of production is shaped by geopolitical and legal forms and contested by imperialist rivalries. Despite technical innovations and contingent variations, we contend fundamental similarities exist between the current conjuncture and the inter-capitalist imperial conflicts of centuries past. This challenges Wark's argument that the new infrastructures of the digital world, the Vector, serve as evidence constituting a new dominant mode of production. Rather, our analysis serves to highlight continuity, through links to their historical lineages and anchor in past practices of the ordering of the international capitalist system. To do so, we prefer abandoning the concept of mode of production when evaluating social change that is more granular, immanent, and thus at a lower level of abstraction. Instead, we use simple categories as a starting point and work our way towards elevating the analysis to a higher level of abstraction if the evidence is sufficient and if this contributes to the broader advantages of periodisation. We do not want to presume and be constrained by categories that may or may not be valid as explanatory tools, but instead reshape those broader categories according to empirical arguments.

For Wark, a key factor justifying the shift away from the capitalist/worker form of surplus extraction is the fact that vectoralists have abandoned owning the means of production, and instead own the vector, which allows the appropriation and routing of information (2019, 13). Information is the new commodity, and it forces us to behave differently than how we behave in a capitalist, commodity-driven economy. Because information is abundant, the goal is to harness it legally and infrastructurally, rather than produce it from scratch thanks to the exploitation of workers' labour (13). Thus, owning the legal and material infrastructures – the vector – through which information is controlled is the key process that establishes the ruling class of this so-called new mode of production. Thus, the difference with capitalists is that once they own the means of production, they still must extract surplus wealth from the labour of workers and exploit that labour. Vectoralists, instead, employ hackers to find creative ways of controlling, replicating, storing, and transmitting information, making new out of the old, and controlling a knowledge economy that serves their purposes.

However, we argue that when analysed from a more geopolitical and legal standpoint, as well as from a more economic and value theory perspective, the contemporary use of infrastructure space remains consistent with how capitalism has been expanding for centuries. The changes described above remain of an "organisational capacity and arrangement", and some are better explained as remnant temporalities, spatialities, or "back stories" of pre- and early capitalism. Through the concepts of "extrastatecraft" (Easterling 2016), "infrastructures of empire" (Aouragh and Chakravartty 2016), and how technological and legal infrastructures are supporting the imperial reach of the US (D'Eramo 2022; Hu 2016), the geopolitical lineages from 19th-century extraterritoriality to contemporary forms of legal imperialism reveal themselves. Moreover, from an economic perspective, logistics remain the nerve centre of capital accumulation (Mau, 2021; Chua 2021; Khalili 2020). These reflect ways in which infrastructure is used today as an invisible, indirect geopolitical strategy of management between contending actors, and show that what seems to be a new use of technology remains grounded in a set of classic geopolitical imperial rivalries. For "digital capitalism" to function, this space remains materially grounded, e.g., with undersea cables

owned largely by US telecommunications companies (Jung 2022), as well as immaterially grounded e.g., through "the 'soft' and more amorphous networks of cultural exchange shaped by European (and American) colonial power" (Aouragh and Chakravartty 2016, 564).

From a political and legal vantage point, the routing of information requires state and non-state infrastructure space, which can be described as "extrastatecraft" (Easterling 2016). "As a site of multiple, overlapping, or nested forms of sovereignty, where domestic and transnational jurisdictions collide, infrastructure space" as extrastatecraft is pushing further the boundaries of legal invisibility (Easterling 2016, 15). As a "secret weapon" of statecraft, "it orchestrates activities that can remain unstated" and Easterling uses three examples that make up various strata of this infrastructure space: the multiple types of free zones, the communication networks and cables for broadband, and global management standards by the International Organization for Standardization (ISO) (Ibid.). This work, illustrative of a Critical Infrastructure Studies approach, provides a useful basis to discuss the stubbornly capitalist logic operating in these spaces and the long-term entanglement of Big Tech with the state (see Parks 2015; Bhagat and Phillips 2023). Moreover, literature in communication studies focuses on the concepts of "data colonialism" (Thatcher, O'Sullivan, and Mahmoudi 2016; Couldry and Mejias 2019), "computational infrastructures" and "extractive infrastructures" (Aouragh et al. 2020; Buxton 2022), emphasising the colonial and racial logics of extraction and accumulation as central to capitalism today. These cloud infrastructures "generate harms and damage beyond ethical issues of privacy, ownership, and confidentiality. They displace agencies, funds and knowledge into apps and services and thereby slowly but surely contribute to the depletion of resources for public life" (Pritchard and Snelting 2022, 8). Thanks to these technologies, and notably through contact tracing apps during the Covid-19 pandemic, Big Tech companies "have externalized the risk of delivering services to workers who are stripped of labour rights and are made to carry the risk of health costs, lack of demand and damages" (Aouragh et al. 2020, 9.4).

Focusing more on the material aspects of these infrastructures, the example of undersea cables, essential for providing ninety-nine per cent of telecommunications today, is useful. They play a key role in the literature on vectoralism and techno-feudalism, conceived as tangible assets to "harvest and process data" (Rikap 2023, 151). However, they can also be used to justify a more imperialist analysis of international relations focused on the hegemonic role of the American empire through US companies, government, "Wall Street and military and intelligence agencies" (D'Eramo 2022, 11; see also McGeachy 2022). If constructing and owning these cables has become a top priority and competition for Big Tech, are cables a material, economic, and geopolitical mechanism of accumulation that remains nevertheless determined by capitalist social relations? Or is their role in increasing these companies' intellectual monopolies and thus the phenomenon of rentier capitalism (or techno-feudalism) a sign that we are in a new mode of production? We cannot fully answer these questions here, but two elements seem crucial and point heavily in the balance of the first hypothesis; towards an explanation anchored on a capitalistic imperialist, geopolitical rivalry.

First, we see the rising importance of the security dimension regarding cables and related infrastructure, illustrated by the Nord Stream pipeline sabotage in September 2022, and by the threat made by Russia of sabotage in June 2023, leading to NATO officially focusing its efforts on this area (Bueger et al 2022; NATO 2023; Besch 2023). Second, there is a particular density to the "entanglement of the tech giants and the American state" (D'Eramo 2022, 11), today and in the early twentieth century (Morozov

2023), which is coupled with recent arguments for contemporary forms of "political capitalism" (Riley and Brenner 2022). These justify a focus on the emergence of two new European main hubs for cable landing (Bude, UK, and Marseille, France) as additional cases for taking an imperialist perspective to the development of these technologies. Bude will have nine cables arriving at its beaches by 2024 (Submarine Cable Map 2023), and Marseille will have sixteen cables landing in its port by 2025 (Marseille Fos 2023). These concentrated landing sites show the role of the state in managing and negotiating the location, construction and ownership of these cables, their landings by tech companies, and their impact on local and national economies that seek to gain from these shared investments. The location of Bude is not a coincidence. As the landing site for the 19th-century Telegram cable, its region is also connected to a history of state surveillance and data collection through its hosting of GCHQ, the UK's third intelligence agency, which was found through Edward Snowden's revelations, to be using cables to intercept personal communications and share it with its US counterpart, the NSA (Guardian 2013). Vodafone, a key player in these cable investments, vaunts on its website its ownership of twenty-five cables while also celebrating their history and "public" value:

> From royalty and presidents to status updates and selfies, underwater cables have quietly been playing an indispensable role in our history and culture for the past century and a half (Lu 2020).

Google also celebrates, on its blog announcing the Grace Hopper cable landing at Bude, the idea that these companies are not only contributing but shaping and directing the future of cables as common goods key to economic progress:

> We know that technology is only becoming more important for the U.K. economy … improving the diversity and resilience of Google's network is crucial to our ability to continue supporting one of the U.K.'s most vital sectors, as well as its long-term economic success … we look forward to supporting the next great U.K. tech innovations (Stowell 2021).

If Easterling traces the lineages of her three cases of extrastatecraft to the late 19th century, it is also useful to further emphasise the links between today's use of infrastructure to 19th-century imperial processes of extraterritoriality. Those links show similarities, not in the infrastructure itself, but in the ways it is deployed. The extraterritorial management of what was considered "semi-sovereign" space was a strategy deployed by dominant powers in place of overt colonialism (Raustiala 2009; Craven 2005). It was more indirect, more diplomatic, and more pernicious, in how it integrated notions of legal, political, ideological, and racial superiority. Overall, extraterritoriality and the use of unequal treaties in the 19th century were part of the expansion of international law as a capitalist and imperialist structure of geopolitical order.

Wark says very little about the horizontal class relations between the purportedly different types of surplus wealth extractors, i.e., the remaining capitalists and ascendant vectoralists. Looking back to 19th-century contending powers rivalries, we see how the five great powers and new empires (France, Britain, the US, Russia, and Germany) managed the transitions of the old empires of the Mediterranean and the East (e.g. China, Japan, the North African states, the Ottoman empire) into a new capitalist world economy, notably through the mechanism of extraterritoriality (Kayaoglu 2010). As a legal infrastructure, extraterritoriality helps us to think differently about the so-called vectoralist class today. Rather than assessing current extractive infrastructures as

signs of a new mode of production, we can similarly understand them as strategies to manage jurisdictional powers and hierarchies between contending actors; first between corporate tech giants and the now old but same "great power" states, and second between tech-giants and industry-based states (BRICS) (Chakravartty and Schiller 2010).

From a more economic perspective, improving and developing new "means of transportation and communication has been an integral part of the capitalist mode of production from its beginning", because "capital is able to re-organise the global geography of production" (Mau 2021, 18). For Mau, contemporary logistics and infrastructures are another extreme manifestation of valorisation, "an apparatus for carving the logic of valorisation into the crust of the earth" (Ibid.). Beyond the powerful imagery, the idea is that valorisation, as an effect of real subsumption, i.e., "capital's continuous remoulding of the technical and organisational aspects of the labour process" (Mau 2021, 15), overflows from that labour process and remoulds nature and geography too. In fact, Mau argues that not only is infrastructure today another key example of how capital shapes production, but it also reinforces it by making "it tremendously difficult to break with capitalism, since it increases the scale on which such a transformation would have to take place" (2021, 19). Thus, for Wark's provocation and transition to be effective, it would need to show how vectoralists have taken over the valorisation of labour, nature, and geography at an unprecedented global scale.

If we take a view that de-centres the labour process and combines other processes – such as the commodification of nature, geography, and more specifically for us here, information and its alter-ego, attention (Davenport and Beck 2001), the specific changes to the labour-process that Wark focuses on as key criteria for the transition appear insufficient. In other words, when viewed in a broader global totality of how capital extracts value, even though it may be innovative, the core similarities between the exploitation of labour, nature, geography, and information reveal themselves. We return to a "levels of analysis" question, where, from a higher level of abstraction, change is more difficult to prove.

For Mau, this refers to Marx's expression of the "mute compulsion" of capital (Marx 1990, 874) and is better understood through an analysis of "economic power" (Mau 2021; 2023). However, what we retain is the process of valorisation that economic power represents and how it is seen as "indirectly" affecting bodies (including brains) through the social and material environment (Mau 2021, 8). Mau's work helps to remind us that this distance, this invisibility, this condition of being "unstated", as Easterling writes, is at the core of capital accumulation. And it is *also* at the core of Wark's argument as evidence for the death of capital. In this sense, the vectoralists are more indirect and invisible than the capitalists in how they operate. They indirectly extract value from information and our attention, they indirectly own the means of production (or technological infrastructure), they indirectly make a profit through advertisement and search engines (Morozov 2022), and they try to look like they are providing us with the means to be free, sociable, caring, creative, online communities. They are even more inauthentic than traditional capitalists. But at their core, they remain capitalists and they operate in a geopolitical context shaped by imperial rivalries as a latent dimension of the past e.g., 19th-century strategies and logics of international ordering.

4. Conclusion

Wark raises stimulating questions and is right to be critical of the limitations of labouring with a tired conceptual apparatus. That said, we argue that when her ideas are brought into dialogue with a thoroughgoing analysis of the breadth of digital capitalism, and

challenged through dialogue with broader critical traditions, it appears that capitalism is unlikely to be displaced any time soon. We remain in a digital world which looks extremely capitalist.

Through this dialogue, we argue for a more careful historicising of current changes in the global political economy. Setting aside the concept of the mode of production – better suited to a more *a posteriori* and higher level of abstraction – the article focuses instead on the potential for granular social change and the need to understand contemporary changes as linked to pre- and early capitalist social-property relations. We show how, in the realm of contemporary material infrastructures such as undersea cables, geopolitical imperial rivalries and indirect strategies of territorial management *à la* 19th-century extraterritoriality, remain a better way to understand current forms of accumulation and horizontal competition between dominant actors such as states and corporations.

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2. Digital Labour and Class

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Building the Future? Software Workers' Imaginaries of Technology

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Abstract: This article investigates an actor's perspective on digital capitalism. We study software workers' orientations towards their work by focusing on the social use value they attribute to it. The concept of use value allows us to examine the contradictions software workers might experience in digital capitalism. Drawing on the literature on the control of software workers and the New Spirit of Digital Capitalism, we identify hindrances to the workers' claims of a social use value and explore the imaginaries of technology which might form the basis for a critique or legitimation of digital capitalism. We find that software workers hold strong claims of a societal use value towards their work. While their ethos of good technology forms a strong foundation to critique hindrances they perceive in creating useful technology, imaginaries of technology as an autonomous force might delegitimise the workers' claims.

Keywords: software workers, digital capitalism, imaginaries of technology, Spirit of Capitalism, use value of work

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1. Introduction

This article investigates an actor's perspective on digital capitalism. There is a lot of research on the business model of digital capitalism (Pfeiffer 2022; Nachtwey and Staab 2016; Seidl 2023) and on its cultural basis: the Californian ideology and its Solutionist worldview (Barbrook and Cameron 2001; Nachtwey and Seidl 2023). There is also a growing field of research on tech workers (Dorschel 2022a; 2022b; Ziegler 2022; Daum 2021; Thompson 2019), which especially focuses on coders as a new social class and on their subjectivity understood as "cultural self-understandings, attitudes and motivations towards labour" (Dorschel 2022a, 295). Engaging with a strongly sub-

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ject-oriented perspective on work-related orientations, this paper expands this literature and investigates software workers'[1] interpretations of their experiences in digital capitalism. By examining the software workers' orientations towards their product and the way they interact with their work organisation and imaginaries of technology, we link a subject-oriented approach with the debates on digital capitalism and its ideology.

In the following, we will first elaborate the theoretical background of our empirical study, which is informed by Marx' concept of the use value of commodities. This concept allows us to closely examine subjective orientations towards one's work product in light of the contradictions of the capitalist organisation of labour. In order to contextualise the software workers' claims of the use value of their product, we also turn to the literature on the control of software work and the Spirit of Capitalism. From this engagement with the literature, we derive the analytical framework for analysing the software workers' orientations. After a brief presentation of our research methods, we present our findings regarding respondents' claims of the use value of their work product, hindrances they experience in fulfilling their claims and imaginaries underlying these claims. We find that different imaginaries of technology can either support forms of critique of digital capitalism or immunise digital capitalism against critique.

2. Theoretical Background

Software workers play an important role in digital capitalism. They work for companies creating software for the digitalisation of work in other sectors and that represent the vanguard of innovations in technology and work organisation (Holtgrewe 2014, 9). Thus, they hold "inscription power" (Dorschel 2022b, 1303) by producing software for others, all the while being subjected to control and ongoing restructuring of their work process. Agile work organisation is one example of transformations in the software world trickling down and spreading into other sectors and spheres of life (Daum 2021, 34) and becoming a broader organisational strategy (Pfeiffer, Nicklich and Sauer 2021, 2). As Seidl's definition of digital capitalism stresses, digitalisation "is both transformative of and driven by capitalism" (Seidl 2023, 2). Hence, we cannot understand the processes of digitalisation and capitalism as separate from each other (Seidl 2023, 3). Thus, this paper investigates software workers' orientations towards the product of their work in the context of both the capitalist organisation and control of their work and the cultural underpinnings of digital capitalism.

In the following, we will present three strands of literature that form the basis for our empirical investigation of software workers' claims of the use value of their work product. Studies of subjective claims towards work draw our attention to the use value of one's work product as a possible source of critique of alienating working conditions. Studies on marketisation and new forms of control of creative work hint at structural constraints to these claims. Studies of elite discourses in digital capitalism detect Solutionism, the belief in technological solutions to social problems, and direct our focus to software workers' imaginaries of technology and the critique or legitimation of digital capitalism they imply.

First of all, by studying subjective orientations at work, we follow the tradition of subject-oriented studies on work consciousness. These studies have highlighted that

[1] We use this term to investigate high-skilled tech workers in the software industry. The sample includes workers with different job descriptions who are, however, all involved in technological aspects of software development: nine software engineers, two software architects, two project leads, one data scientist, one solution manager, one cloud engineer and one software consultant.

workers are no mere product of the working conditions and discourses around work and that their orientations do not reflect neoliberal individualistic norms (Hürtgen and Voswinkel 2017, 114). Besides moral claims of justice which have come under threat in the context of precarisation (Menz 2021, Hürtgen and Voswinkel 2017), recent research finds other claims towards work: Menz identifies claims of rationality (2021, 133-134) as part of professional morality. Hardering highlights value conflicts around professional standards of the quality of work as one barrier to meaningful work experiences (2020a, 197).

In this context, Sarah Nies investigates 'work-content-related interests' in the usage of one's product and the impact and purpose of one's work (2021, 37). Instead of seeing these interests as leading to ever more self-exploitation (2021, 32-33), she stresses their critical potential. She contends that the engineers she studies are more interested in the content of their work and its impact on others and society than in self-fulfilment or other individual self-interests (Nies 2021, 36-38).

Nies' interpretation draws on Marx' identification of the "twofold aspect" (Marx 1987/1859, 290) of the commodity: the use value and exchange value. This distinction lies at the heart of Marx' labour theory of value and guides our study of software workers' orientation towards their work product. The use value depends on the physical properties of an object that grant satisfaction of human wants and needs. As a quantitative measure, the exchange value abstracts from the qualitative properties and use value of commodities and relates the value of one commodity to the value of another. In capitalism, the measure creating this equivalency between qualitatively different commodities is labour time (Marx 1987/1859, 290-293).

Nies sees this distinction as a cause of alienation: Creating an exchange value makes one indifferent to the content of one's work and thus alienates the worker from his product (Nies 2015, 28-29). However, Nies stresses that the worker might still hold an interest in the use value of the product, which can be in conflict with the entrepreneur's interest in its exchange value (Nies 2015, 30-31). Nies explores the critical potential of this contradiction between claims of the use value of work and management's interests in valorisation (Nies 2021, 28-29). This directs our research interest to how software workers perceive the use value of the technology they create.

In order to study the way software workers experience the pressures of valorisation in their work, we turn to the second strand of research on the control of creative work in digital capitalism. While capitalists always need to control their workers in order to make sure the labour power they purchased is exerted to their benefit, this control becomes more difficult in the realm of creative work. The software workers we interviewed perform creative labour as they create novel software solutions or adapt them to customers' needs. Hodgson and Briand emphasise the conflict of creative work with commercialisation and the difficulties for management control due to the unpredictability of its outcomes (2013, 311).

Various studies have pointed to the effects of agile work methods and marketisation on digital work. ÓRiain identifies the project deadline and technical specifications as a translation of market pressures into the work process (2010, 337-45). Barrett stresses the tension between the control exerted by time and market pressures and the necessary technical autonomy in software work (2005, 177-178). Even though agile methods started as a critique from software workers themselves (Beck et al. 2001), for Daum, they provide the means for the real subsumption of mental labour to capitalism (2021, 35). Agile methods include customer feedback from the beginning and incremental improvements of the software instead of delivering one tested version at the end of a project (Daum 2021, 31). Hodgson and Briand notice in their study on agile teams how

agility creates “a powerful ideological form of control” (2013, 322), as autonomy and emancipation are limited to the choice of tasks and work methods but not expanded to important decisions such as targets or resource allocation. Barrett shows how hybrid strategies of direct control and responsible autonomy, as Friedman (1977) described it, uphold the myth of creative and autonomous magicians (Barrett 2001, 32). In sum, this research points to two mechanisms of agile work methods: It translates market imperatives into work and motivates work by veiling hierarchies. This research raises the question of how workers perceive different forms of control as furthering or hindering the creation of use value in their work.

The third strand of literature we build our study on is the research on the Spirit of Capitalism. This literature is based on the assumption that capitalism relies not only on formal modes of control but also depends on a cultural basis. Developing Weber’s proposition that the rise of capitalism relies on an ethos motivating actors and legitimating their actions (Weber 2016/1904-1905; Nachtwey and Seidl 2023), Boltanski and Chiapello (2005) argue that capitalism is in constant need of legitimation to uphold participation in this otherwise irrational and unfair system. The two authors study management literature and track changes in the normative order of capitalism over time. Their study provides evidence for a new, project-based order. This analysis includes a dynamic conception of the orders of worth supporting capitalism, as capitalism constantly faces critique and needs to change or incorporate this critique in order to survive. Drawing on this theory and analyses of the culture of Silicon Valley (Turner 2008; Barbrook and Cameron 2001), Nachtwey and Seidl (2023) find a new normative order in the speech of tech elites: the Solutionist ethic. This ethic justifies the activities of tech firms by equating economic success with the solving of humanity’s problems. The term ‘Solutionism’ was coined especially by Evgeny Morozov and does not only describe the belief in technological fixes to social problems but also criticises a misidentification of complex social problems as “neatly defined” and “easily optimized” (2013: 6). A Solutionist ethic thus strongly builds on a certain conceptualisation of technology, its characteristics and its role within society. Since the theories on the Spirit of Capitalism study elite discourses, we know little about whether Solutionism resonates with subjective work orientations. Thus, we study the software workers’ imaginaries of technology, which might shape how workers conceptualise the use value of the technology they create and thus further contribute to a legitimation or critique of digital capitalism.

These three theoretical approaches inform our analysis of software workers’ orientations towards their work product. First, we ask how software workers conceptualise the use value of their work product. Then, we turn to the hindrances they see in fulfilling these claims within their work organisation. Thirdly, we investigate how software workers imagine technology and how they interpret technology’s role in society. This informs us about their professional ethos, which might form the basis for critique or legitimation of digital capitalism. By analysing these three aspects of the orientation of software workers towards their work product, we aim to answer the following research questions: How do software workers make sense of their work and their role in society in light of the contradictions of their work process? And how do their orientations relate to a critique or legitimisation of digital capitalism?

3. Data and Methods

As a part of the larger research project *Digital Alienation and Appropriation of Work* conducted in Germany and Switzerland, we interviewed 17 software workers in both countries. The interviewees were recruited online between June 2020 and August

2021 according to the principles of qualitative, theoretical sampling to achieve maximum contrast (Kelle and Kluge 1999, 44-46). The sample includes five female and 12 male software workers between the ages of 27 and 58.[2] The interviews were mostly conducted online through video call software due to the COVID-19 pandemic.

The semi-structured interviews (Hopf 1995, 177-178) focused on the respondents' everyday work experiences, their evaluation of their work, and the meaning of work for them and society. We conducted the analysis in two steps: In the first round, we conducted descriptive case analyses focusing on the main topics of the interviews in order to identify sufferings and coping strategies, norms and values and definitions of work and technology. In the second step, we performed an in-depth linguistic analysis of selected segments of the interviews. We directed the analytical attention to the segments in which the software workers spoke about the quality of their product and the meaning of their work for society.

The analysis adhered to the principles of Jan Kruse's *integrative basic procedure* (2015), which builds on a thorough linguistically informed description of the material. For the purposes of this study, we focused on agency and metaphors (Lakoff and Johnson 1980). Building on detailed case analyses, we searched for patterns and overarching motives throughout the interviews by contrasting and comparing (Kelle and Kluge 1999, 75-76). These steps connect to the principles of abductive analysis (Tavory and Timmermans 2014; Timmermans and Tavory 2022; Yuill 2017), which focuses on finding surprising aspects of the data in order to extract patterns, similarities and differences (Tavory and Timmermans 2014, 125-126) to create a dialogue between theories and the data for theory construction.

4. Analysis[3]

In the following, we will present our analysis of the respondents' interpretations and orientations of their work focusing on the claims of a social use value of work, the hindrances to fulfil these and the imaginaries of technology and its role in society. The way people imagine technology's role in society is an important aspect of their professional ethos and of how the contradictions between their claims and the work organisation they experience are translated into a critique of capitalism or rationalised and legitimised by imaginaries of technology.

4.1. Claims of the Use Value of Work

Generally, we find that the respondents do not merely seek self-fulfilment and a pleasant work experience in their job, even though this is an important aspect of work for software workers.[4] Confirming Nies' point, we find a strong orientation towards the social use value of the software workers' product in the interviews. They conceptualise the use value of their work on two different levels: as a use value for society at large, technological progress and all of humanity or as a use value for individual others. Some

[2] The gender imbalance reflects the male dominance of the field. Even though we attempted to over-represent female software workers to capture more contrast, we believe that this was further complicated by child-care responsibilities during the COVID-19 pandemic, which might have disproportionately been taken on by women.

[3] The quotes marked with a (*) have been translated from the German transcripts to English. All quotes were corrected and simplified for better understanding.

[4] This orientation towards fun and interesting tasks is epitomised by one statement about the meaning of work: "*If I didn't have this job, I would have to provide riddles for myself, I'd be pretty bored*." (Daniel*)

interviewees also actively reject the notion of work having a greater meaning. The following section takes a closer look at these different ways of relating to the social use value of one's work.

4.1.1. Use for Society at Large

Speaking about the use value of their work, respondents at times refer to society, nature or humanity as abstract entities benefiting from their work. Technological progress then appears as necessary for the progress of society, for welfare and prosperity and for the development towards a more sustainable economy:

> "And I do believe that it allows for many people to live together, to have enough food […] and that it makes a contribution." (Thomas*)

The orientation towards humanity or society is based on an abstract understanding of work as related to society and on a positive notion of (technological) progress. Seeing this abstract form of a use value for society also entails a claim of building something that lasts and that benefits a large number of people. Accordingly, if the products are never used or only benefit a very limited number of people, the respondents question the use value of their work.

This orientation towards a greater good builds on norms and values that are not purely economical, yet do not necessarily stand in contrast with economic criteria. While some stress the use of their products by governments or public services, drawing the picture of a greater good outside of the economic sphere, many also express "believing in the mission" of their company or increasing economic efficiency through their products. This implies a concept of the economy as a force of good, which creates welfare, and of companies as political and social actors with a mission to better society. This contains elements of the Solutionist ideals of technology as a solution for social problems. However, our respondents do not adhere to the strong belief in the inherent value of technology per se.

We detect this more critical view in another way of perceiving one's work as a contribution to a greater social good: imagining one's role as an expert, translator, and a bridge between society and technology. This can entail an understanding of technology carrying not only benefits but also risks for society. In this sense, Leo sees it as a contribution to society that he tries

> "to achieve the balance and that technology doesn't have to be employed everywhere." (Leo*)

Another way to conceptualise this role as a translator is by stressing societal norms and values one inscribes onto technology, for instance by ensuring data security. This motif stresses the political character of technology and the software workers' privileged role as experts in the field rather than the inherent benefits of technology that Solutionism assumes.

However, not all respondents share this concern for the social use value of their work: We find respondents who downplay or outright refute the notion that their work has an impact on society. This can represent a rejection either of Solutionist claims to change the world through technology or the moralistic claims to a meaning of work for society in general. Some see themselves modestly as cogs in the machine who cannot claim that their small contribution changes the world. Others believe that work is not the sphere in which they can "*combat world hunger*" (Tina*). Sometimes, this rejection

stems from a sceptic view on the greater good of economic developments, such as automation. Other times, the respondents stress that they seek a social impact outside of work. However, none of the respondents are completely indifferent towards the quality or the impact of their work. Even when they downplay their impact, most respondents stress that they would not do a job that was harmful to society, for example in the weapons industry. This still positions them as moral actors:

> "It is important to me is that it doesn't necessarily destroy the planet or put other lives at risk, but for me right now, I'm not a strong idealist, who has to see a super deep meaning in her work." (Tamara*)

4.1.2. Creating Use Value for Individual Others

A slightly different concept of the use value of work is more concretely aimed at other individuals. Doing something good is then understood as helping others, customers or colleagues, which reveals a strong social orientation. The software workers often explicitly mark creating use value for others as something that reaches beyond the economic sphere: Their work can create a cheerful event among colleagues, make someone "*smile*" (Damian*) or be about not letting others down. This orientation towards others provides motivation to do the job well. The engineering ethos of efficiency guides this idea of a use value for others. While perfection beyond a certain point does not translate into extra profits in the software industry, this orientation is still often very compatible with the companies' interests, for instance when it motivates doing extra hours to fix a bug for someone.

However, the implied values of reciprocity, trust and altruism for some contradict or seem incompatible with economic motivations. One respondent explicitly criticises that acts of altruism are sometimes a part of the performance evaluation. This seems "*weird*" (Judith*) to her, as she stresses that performance evaluation is not her motivation to help colleagues. This shows that she perceives a contradiction between social orientations and economic valorisation and control processes, which in her eyes devalue or threaten her acts of immediate kindness.

4.2. Hindrances

Having explained the claims software workers make regarding the use value for society at large or for other individuals, we can turn to the way in which respondents experience and interpret constraints and pressures of the digital economy, which make it harder for them to perceive their work as useful. These include time pressures, market pressures, irrationalities in their work process and contradictions between technological ideals and digital capitalism.

4.2.1. Time Pressures

Most software workers complain about time pressures in an ever more stressful and short product cycle. Especially those who have been on the job for a longer period of time, diagnose an acceleration of both technological developments and product releases. The following statement laments this ongoing escalation:

> "You always think it can't get any worse but it gets worse every time. (laughs) So twenty years ago it was different from now. (laughs) It's just ever tighter cycles, less and less people who have to do more and more." (Tina*)

The respondents report many ways in which this affects them. Firstly, they point out that the speed of technological development and agile work methods means that they have to adapt to new technologies and shift between projects quickly. They describe this as tiresome and obstructive to immersion in coding and concentration. Software workers are required to respond immediately to customer demands, which further fragments the workday. Secondly, they perceive the short cycles as endangering their professional ethos. Time pressures lead to less time available to stay up-to-date on technological developments or to perfect the product. Thus, the software workers might feel forced to deliver products that are not up to their own quality standards. They feel like they have to tinker with the software instead of being able to plan and build it thoroughly. Thirdly, the interviewees' accounts suggest that time constraints also affect the software workers' own work processes: Short and tight cycles make it impossible to update the companies' own technology or processes. The fast and flexible production of technology also entails ever-changing teams in projects. This might lead to frustrations with the initial social and infrastructural groundwork necessary every time. The short technological cycles can lastly lead to frustrations, as one's work can become superfluous when the company decides to shift to different technological products. The product that a software worker had offered and prepared for a customer might not be in the portfolio anymore by the time it is finished. Generally, the acceleration of technological developments challenges claims that the interviewees hold regarding the use value of technology, as the workers feel that time pressures not only worsen their work experience but also the efficiency and quality of their product.

4.2.2. Market Pressures

Time pressures are in part a result of market pressures, as they arise from attempts to keep the labour costs for a product as low as possible and to deliver a product quickly and efficiently in a competitive environment. Yet, market pressures and the market's logic also translate into the software workers' everyday work experience in other ways. The pressure from customers to create a cheap product limits the available time and effort one can put into the software. According to one software worker who consults customers, the economic pressure leads to a downward spiral: The demand for cheap products negatively affects the quality, which then leads to less and less willingness to pay large amounts for the products. Here, the use value for the customer is diminished more and more as the concerns for the costs and customer expectations prevail. Another problem amplifying the time pressure is a lack of resources especially for consultants and architects. They rely on other workers to write the code for their projects but cannot find anyone available to do the job. This leads to what a respondent calls "*negative stress*" (Thomas*): A tight deadline is accompanied by external challenges such as insecurity regarding the availability of necessary resources. Thus, the interviews suggest that market pressures and understaffing aggravate time pressures as they limit the software workers' agency to do their jobs as they believe they should.

A second aspect of market pressure that surfaces in the interviews is that respondents claim that the profit orientation of their firm hinders innovations. Innovations do not lead to immediate measurable economic value and require a lot of resources initially, which makes them hard to argue for vis-à-vis the company:

> "Innovation is always welcome, but innovation brings surplus value a lot later […]. Especially in the initial phase, it's only resources and at least then you can achieve something quickly. But after that to reach a point where there is surplus

> value, basically a return on investment, that takes a long time, it's hard to bridge that." (Leo*)

This statement not only shows how the respondents' future-oriented drive to create a use value is blocked but ultimately also puts capitalism's ability to enable the innovations it relies on into doubt. Many respondents share ideas for innovations in their work process and in the firm but are not given the time to create them.

Even though respondents complain about the market pressures and time pressures of their work, they seem resigned and perceive this as something unchangeable. One respondent complains there is always too much to do but assumes that "*it's like that everywhere*" (Judith*). She seems to see no alternative to her stressful work organisation.

4.2.3. Irrationalities of Work Organisation

Other hindrances to experiencing one's own work as creating a use value result from the characteristics of the capitalist management of work. Some grievances regard the companies and their management directly. Respondents recount instances of bad management, which makes their jobs harder. Sudden and far-reaching decisions, for instance about the software used in the firm, greatly impact how the respondents work. Here, frequent changes can obliterate their work results and lead to feelings of insecurity and powerlessness. These feelings are intensified by the fact that the software workers do not always seem to have a grasp on firm strategies. One respondent complains that many projects are left unfinished, which makes her work feel useless and like a waste of time. She is unsure whether this is bad management or a necessary strategic move. By acknowledging this might be necessary for the company's economic interests, she puts into question the legitimacy of this claim of a more beneficial use of her own time.

4.2.4. Contradictions between Technological Ideals and Digital Capitalism

Besides the contradictions between market pressures and the requirements of innovations, there are other ways in which technological ideals and the structures of digital capitalism clash for the respondents. Negative experiences also stem from a perception of the way their work is organised countering their ethos of efficiency (Thompson 2019, 117-120) and of avoidance of redundancy. This engineering ethos clashes with the logic of competition in the software industry, which creates incompatible technological ecosystems and redundant offers of proprietary solutions. In this context, one respondent claims that technology is too fragmented:

> "I think what is a challenge at the moment is fragmentation of technology. In the sense that you have a lot of small cloud things that are not compatible with each other and then you have to integrate them. This is stupid. […] I think it's a bad direction to go." (Frank)

For Frank, the idea of an efficient technological solution is undermined by the diversification that capitalist competition brings about. Besides the inefficiency of incompatible technology, Emil further complains that his innovations have less of a use value for society because of the redundancies due to competition in capitalism:

> "there is also like competitors, so like, it's not as meaningful as if we would impact the whole area […]. […] This is a tool that is actually not really needed in

> the market, because there are tools out there which all are doing the job, it feels like it's just not as meaningful as if I were to create a tool that is not covered yet." (Emil)

Here, he conjures up the image of creating a real novelty. He complains that his software is offered on one platform while he "*believes in a multiplatform solution*" (Emil). Many other respondents share a preference towards open-source technology. Proprietary software in a competitive environment thus limits the use value of software work: The respondents create knowledge and a product that might be redundant, not open to users and other developers, and incompatible with other technologies.

Another way in which the capitalist organisation of one's work hinders the perception of a social use value is the limited and short-term orientation some respondents ascribe to companies. One respondent explicitly calls out that the horizon of his work is "*limited to the moment or the near future*" (Sebastian*). He also criticises the limited orientation towards the company's profit and voices a claim to work for the greater good:

> "A firm limits itself somehow more to the use that something has for the firm itself, but we should maybe also concentrate more on the use for all of society and for us as a community and that is less present in our firm." (Sebastian*)

These critiques point to the inefficiencies and irrationalities of the capitalist organisation of work, which contradict the software workers' ideals and norms of how to benefit society at large and further technological development. The logic of capitalist organisation that the respondents observe stands in contrast to ideals of technology and its long-term benefits for all. However, even when the respondents criticise the irrationalities, the economic demands sometimes appear as unchangeable rules. One respondent speaks about how his product reduces work for others. "*And then we get more work, but that's how it works."* (Frank) This implies a resignation to the irrationalities of the economic world.

4.3. Imaginaries of Technology

In this last section of the analysis, we try to identify ways in which respondents imagine technology, its development and its role in society. This adds a background to the respondents' claims of a social use value of their work and the hindrances they perceive towards actualising this claim. These three imaginary meanings of technology and its development in the future structure software workers' interpretations and orientations at work. We argue that the different ways of perceiving technology provide resources to either form a basis on which the voiced grievances can result in a (direct or indirect) critique of capitalism, weaken the legitimacy of the voiced claims or serve as legitimation for capitalism. We identify three main ways in which respondents imagine technology: as an autonomous force, as a tool and as a world of its own.

4.3.1. Autonomous Technology

First of all, software workers often describe the development of technology as something inevitable that determines society. We find metaphors, which make technological development appear as something inevitable, or even metaphors of technology as a biological organism. Within this concept, technological progress appears as an auton-

omous process that cannot be stopped. Even the software workers sometimes describe having little to no agency over this process. From this perspective, criticising technological development makes no sense, as David's comparison expresses:

> "I can criticise that the sun goes up in the morning, but that doesn't change anything." (David*)

Technological development appears to be fueled by human nature, which always strives to "*make things better and faster*" (Tamara*). Within a biological metaphor of evolution and environment, society has to evolve with the accelerating evolution of technology:

> "Like, the tech will evolve as usual, it will go faster and faster and society will change, which is not so sure in which direction and how." (Emil)

Vis-à-vis the development of technology as an autonomous process or even as a force of nature, the respondents see society, the companies and themselves in a reactive role, having to keep up and evolve to stay up-to-date. This makes society and humanity the object instead of the driver of technological development and ascribes transformational power to technology in the entire social sphere. This also weakens the claims of better working conditions, as the constant changes in the software industry are a legitimation for the stress at work:

> "Yeah, it's just the way it is. [...] IT […] became a little bit of a stress-profession generally." (Hannes*)

These statements naturalise the current state of technological development in a capitalist setting and leave no room for possible alternative ways of organising it. Granting technology this autonomy might be the framework within which claims of a social use value are delegitimised. Whether this technological progress is seen as a positive force or not, social agency is reduced to reactions to technology.

4.3.2. Technology as a Tool

The second concept of technology we identify is that of technology as a tool. The respondents disenchant myths of software being "*magic*" (Frank) and compare software to tools such as "*hammers*" (Hannes*) or "*ploughs*" (Frank). Within this view, software workers have a humble concept of their work: They merely create the infrastructure for others and mirror the processes of customer businesses to build a tool that fits their requirements.

Thought of as a tool, software lends itself to good as well as bad purposes. This leads to the belief that software workers need a "*moral compass*" (Damian*) for their work and that they hold a position of responsibility to contribute to a "*balance*" (Leo*) in the deployment of technology. It also includes the call for political regulation of technology:

> "So it is becoming more and more important that government has a clear vision, how do we as a society want to allow modern technologies to change our life and how not." (Tamara*)

This perspective on technology rejects Solutionism's view of genius tech entrepreneurs changing the world. Seeing technology as a mere tool can form the basis for a strong

professional ethos though. Beyond the ideal of efficiency, this ethos for some respondents includes concerns for the social effects of technology and a call for morality and political debates at work. However, this view can also detach work from the political sphere and delegate personal responsibility for a broader societal use value to other social actors.

4.3.3. Technology as its Own World

The third imaginary present in the interviews is that of technology as its own world. Software workers sometimes use metaphors of a world or universe to describe technology, which implies different rules, a different language and barriers between the worlds. This is connected to an imaginary of immersion into software work:

> "You can imagine little worlds of software, which is what I find great. Because it's always like a little universe that you are inside of. And I can move inside it." (David*)

This immersion grants software workers a privileged position, as they are the gatekeepers to the technological world. When in contact with customers, they have to "*translate*" between the technological world and the world of the customer. They work "*on the edge of where the user and the machine meet*" (Frank). Within their firms, sales departments are conceptualised as a different world. This shows how different and irreconcilable the economic and technological requirements seem to the respondents.

This view on technology emphasises its own logic, which is different from that of the economy or society at large. This can form the foundation for a (functional) critique of capitalism arising from the experiences of capitalist inefficiencies and the contradictions between market pressures and the logic of technological innovation. However, it might also weaken the legitimacy of the critique of time pressures, as it creates the imaginary of a separate technological sphere, which, similarly to the image of autonomous technology, might legitimise technology's impact on work in digital capitalism.

4.4. Discussion

This analysis of the claims of social use value, the hindrances in fulfilling them and the imaginaries of technology brought several aspects to the fore:

- The respondents hold strong claims towards work that are connected to the use value of their work. They thus position themselves as moral actors with a social orientation. While this can imply working for a greater, societal good, some focus on the use value for the people in their immediate environment. Besides a strong professional ethos, the claims of a social use value are sometimes based on altruistic values. Of course, these claims of a social use value exist alongside more individualistic orientations towards a good work experience.
- The economic pressures and resulting time pressures make it difficult for the respondents to adhere to their own quality standards. This hints at a new form of alienation, resulting not from a lack of autonomy but from "a gap between professional ethics and economic requirements" (Hardering 2020b, 48). Limited resources and the capitalist logic of competition are also named as hindrances to creating a use value for society at large. However, we find different expressions of these contradictory experiences. At times, respondents clearly name and criticise the economic dynamics that cause these experiences. But they also often describe these experiences as an inherent characteristic of the economy or the technological field. We

thus turned to the imaginaries of technology in order to better understand how these experiences might relate to critique and why some claims might not seem legitimate in the first place.

- We identify three metaphorical conceptions of technology in the interviews: Technology as a natural force, as a tool and as its own world. These imply different conceptions of human and social agency vis-à-vis technology, of technology's usefulness and thus of the legitimacy of claims of the use value of work. Viewing technology as a natural force strongly limits society's and the software workers' agency and might naturalise the constraints of digital capitalism as inevitable consequences of how technology works. The imaginary of technology as a tool separates production from application and thus allows for a critical view on technology's impact on society. Negotiating technology's uses and impacts on society is then a political task. While this implies democratic principles, it might limit the legitimacy of a claim to positively impact society through work by attributing conflicts about technology's beneficial use to the political sphere and outside of work. The imaginary of technology as its own world also grants technology a certain autonomy and makes the respondents responsible gatekeepers to this world. This perspective can be the basis for a critique of economic imperatives as they are construed as external forces contradicting technological requirements. Here, the software workers might become the ambassadors for technological ideals they cherish and protect against economic dynamics.

First of all, these findings support Nies' (2021) theory: Software workers hold strong claims of a broader use value of their work. For these workers, these claims are closely connected to a rationalist or functionalist critique of capitalism, which sometimes hampers technology's potential. While these claims are often compatible with the firms' interests, they might also oppose valorisation strategies. Hence, claims of a social use value could bear an emancipatory potential for a critique of digital capitalism.

However, we find that these claims are sometimes not a strong basis for critique, as respondents seem resigned to the status quo and unable to see alternatives on the horizon. This ties our research about social use value to Menz's (2021) theory on the delegitimation of claims towards work. Menz mostly attributes the erosion of expectations and the legitimacy of claims to a "deterioration of working and living conditions" (2021, 140). In the context of software workers, we must turn to other contexts of meaning, which outline horizons of legitimacy in this regard: imaginaries of technology and its role in society. Within digital capitalism, imaginaries of technology will shape what workers can perceive as legitimate claims towards their work. Imaginaries that make technology appear as an unstoppable force beyond human agency then delegitimise claims to software work.

This relates our research to the literature on Solutionism (Nachtwey and Seidl 2023). We find little evidence of a strong belief in the inherent good of technological disruption as a legitimation of digital capitalism in our sample. We instead find a more diverse set of metaphorical concepts of technology that might either delegitimise the claims of a social use value of work or transform the contradictory work experiences into a critique of capitalism. There are two forms in which the respondents' claims are delegitimised: in the economic and the technological realm. First, market logics in software work seem so pervasive that some respondents resign vis-à-vis the pressures in their jobs and the futility of their products' use value within the logic of capitalist organization of work. This confirms Menz's conclusion that while the normative claims of the use value of work remain intact, their scope, addressees and expectations of their fulfilment are reduced (Menz 2021, 142-143). Secondly, when technology is seen as an

unstoppable force, expectations of realising one's professional ethos might be weakened further. In a world ruled by a natural technological force, companies must simply adapt and adhere to technology's rules. Even when respondents criticise company strategies, these are excused by technological forces beyond their control. This is connected to the agile dispositif (Daum 2021) and its veiling of power structures (Barrett 2001): The attributed characteristics of technology veil agency and explain the need for the economy to quickly adapt and swiftly react. Technology then serves as an explanation for a lack of agency at work. Here, the digital and capitalist dynamics seem intertwined in the order of legitimacy of digital capitalism. This interpretation is supported by the very few instances of respondents mentioning acts of protest or being a union member. In cases of strong discontent with their workplace, software workers seem to rather choose to exit the organization than seek change. However, imaginaries of technology and its characteristics can also result in a strong professional ethos. This can be the basis for claims, especially to a rational organisation of the creation of technology and the full use of technology's potential. This can support the critique of proprietary technology and competitive capitalist organisation of innovation work and thus of digital capitalism as a whole.

5. Conclusions

These results further our understanding of the culture of digital capitalism and work experiences within it and point out potentials for and limits of a critique of digital capitalism. Our analysis did not aim at creating a typology or finding direct causal links between different interpretations of technology and work experiences. We rather extract concepts of technology from our metaphorical analysis and theorise how these might relate to different interpretations of the contradictions of claims towards work and their limitations. We find that imaginaries of technology might be an important resource for the subjective interpretation of work in digital capitalism and might serve as a basis for critique or a delegitimation of claims towards one's work. We can show how technology and economic constraints work together to provide a basis for the legitimacy of the status quo and to delegitimise critique. At the same time, we find strong claims that workers hold and sources for a critique of digital capitalism. This adds to the discussion on Solutionism: Neither do technological imaginaries necessarily support capitalism nor do technological utopias necessarily lead to an emancipatory critique of capitalism.

However, our study has some limitations. Our in-depth analysis is limited to 17 software workers, broadly from the field of work-related software. While we achieved maximum contrast within this field (e.g. in age, gender and company size), software workers working at digital platforms, military industry or the public sector might have different orientations. The study also does not provide a basis for assertions about the causal mechanisms between imaginaries of technology and potentials for critique. Thus, it remains unclear to what extent the orientations result from experiences related to technology or to capitalism and marketisation. This calls for more comparative research considering historical developments or other fields beyond software work. The interview study also widely ignores how critique might be voiced, for instance through unionisation or protests. More research on different types of tech workers more closely investigating the expressions of critique is still needed. Further studies might also shed light on how the claims of the social use value of work relate to other claims such as a good work experience or social justice and which of these orientations is most important for the way in which software workers legitimise or critique digital capitalism. In general, studying subjective work orientations and imaginaries of technology proved to

be a promising field to better our understanding of the legitimation and critique of digital capitalism.

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Chained to the App: German Bike Couriers Riding into Digital Capitalism

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Abstract: In the digital age of platformisation and digital capitalism, this study demonstrates the significant role of institutionalised relationships in influencing autonomy-control dynamics within platform companies. By contrasting multinational food delivery corporations with local cooperative courier services in Germany, we find that algorithmic management centralises control in commercial platforms, thereby limiting worker autonomy. In contrast, cooperative models prioritise communication, trust, and self-determination. These findings underscore the role of works councils and collective representation of interests as countervailing powers in commercial platforms, actively advocating for worker protections. In summary, this study highlights the pivotal role of institutionalised relationships in shaping the evolving landscape of work. It also emphasises the significance of these relationships in achieving a more equitable and humane work environment.

Keywords: platform capitalism, platform cooperativism, algorithmic management, riders' resistance, co-determination, collective management

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1. Work, Employment, and the New Rules of Digital Capitalism

In our contemporary landscape, the rise of digital capitalism and the phenomenon of platformisation have become inseparable. The life and work of individuals and organisations, as well as their perceptions and self-perceptions, are permeated by 'smart' gadgets, personal training apps and algorithms creating automated network profiles and filtering job applications. Platform companies are shaping the present political economy and increasingly inscribing themselves in various dimensions of everyday life (Altenried 2021, 51). This phenomenon, often referred to as 'platformisation', is closely linked to the broader transformations we are witnessing – transformations characterised by increased flexibility, the evolution of deregulated working relationships, and the relentless march of communication technologies and financialisation (Altenried, Dück, and Wallis 2021). In essence, it is akin to a form of rationalisation that, as Habermas (2019) points out, verges on a 'colonisation of the lifeworld'.

Datafication and algorithmisation have become socially established standards that provide orientation for diverse societal actors. This platform-based digital capitalism and the gig economy have transformed work and employment relationships. Additionally, neoliberalism has eroded worker protections and increased employer power. Artificial intelligence and its commercial distribution in business contexts ensure that the 'digital aristocracy' retains the profits. As platform-based companies grow in size and influence, they gain more social control and accelerate the marketisation of human

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lives. As a result, it is essential to recognise that gig work has metamorphosed into data work, fuelled by the algorithmic infrastructures that enable its operation (Lata et al., 2023). This transformation brings about complex forms of control (Habermas 2019) and modes of accumulation rooted in new forms of domination. Platforms meticulously organise, control, and measure work processes through standardisation and modularisation. Here algorithmic management takes centre stage as a precise mechanism of worker control, reshaping the power dynamics between employers and workers.

This paper, based on two qualitative case studies conducted in Germany, examines the tensions between autonomy and control inherent in platformisation and digital capitalism. The research questions are as follows: On the one hand, how does the presence of institutionalised relationships as countervailing power structures influence the autonomy-control dynamics within platform companies in the context of digital capitalism and platformisation? On the other hand, how does algorithmic management influence these dynamics in the context of different types of labour arrangements, in multinational bike courier businesses and local cooperative bike messenger services? The first section provides the theoretical framework and discusses the relationship between rationalisation, culturalisation, autonomy and control, and the transformative impact of datafication, algorithmic management, and platformisation on the gig economy and modern labour markets. It highlights the paradoxical tension between promises of autonomy and the reality of increased control in platform work. The second section focuses on the logic of algorithmic labour coordination and investigates the effects of (institutionalised) relationships that can function as a countervailing power to platform companies. The study offers a comparative lens, contrasting a multinational bike courier business reliant on an on-demand workforce with a local cooperative bike messenger service in Germany, where bike messengers operate as self-employed entities. This juxtaposition reveals disparities in power dynamics, providing insights into the oscillation between autonomy and control within the workforce. And it exposes the dichotomy between the ‘digital aristocracy’, the people ‘above the algorithm’ (who own or program the algorithms), and the sizeable precarious workforce ‘below the algorithm’. These power imbalances have generated various labour struggles and have gradually brought forth institutionalised relationships serving as countervailing powers. These relationships wield influence, compelling employers to heed worker concerns and act accordingly.

In contrast, the cooperative model presents an entirely different narrative. The collective ownership structure, devoid of formal hierarchies, is a defining feature. Here the challenge lies in coordinating a smaller workforce through an algorithmic labour application crafted exclusively for democratic enterprises. Yet, even within this context, datafication processes persist, because of the utilisation of free software. In the third section, the comparative discussion of these two cases shows how algorithmic management shapes these distinct labour landscapes, whether stifling or enhancing communication and interactions, restricting or amplifying worker autonomy, and empowering or restricting the ‘digital aristocracy’. This section explores how institutionalised relationships can either facilitate or hinder labour protests. The conclusion highlights the broader implications of platformisation and digital capitalism for worker protection and labour activism.

2. Gig Work as Data Work: The Role of Algorithms in Shaping the Future of Employment

Modern society is characterised by processes of rationalisation, standardisation, formalisation, and generalisation of the social in general and the working world in particular (Weber 1984; Helmond 2015; Reckwitz 2017a; Minssen 2023). Rationalisation uses technology to enhance production efficiency and is seen as bringing both progress and alienation. Technology as an exogenous factor has a considerable influence on working conditions, though the objectifying effect of technical and bureaucratic processes obscures domination (Popitz 1995, 138). Technology as an endogenous factor, on the other hand, is based on the capitalist goal of cheapening labour and can lead to a de-skilling process (Marx 1863). These rationalisation effects are closely linked to capitalism and its crises. Efforts at rationalisation in recent decades have therefore been accompanied by a process of culturalisation. Culturalisation, the supposed opposite of rationalisation, stabilises capitalism as the dominant paradigm. This shows that rationalisation and culturalisation are two sides of the same coin.

Culturalisation, as distinct from rationalisation, emphasises social recognition (Reckwitz 2017b). The processes of culturalisation are tied to 'doing singularity', that is, expressing the uniqueness of people, objects, and organisations. It involves sacralising people or elements as special and non-exchangeable (Reckwitz 2017a). Digital technology enhances identity formation and the connection between autonomy and technology. Besides the commodification of culture, culturalisation also integrates culture into work contexts, inspired by the principles of positive psychology (Seligman 2011), in order to engage and retain employees. It promotes a 'culture of positive emotions' and highlights employees' subjective involvement, self-responsibility, and personal satisfaction. This shift toward individuality, enabled by digital technology, promotes autonomy in identity formation and the emergence of subjectification in organisations.

Subjectivation, denoted in German as the *Subjektivierung von Arbeit* (subjectification of work), is prominent in today's post-industrial economy. It signifies management changes in coordination, control, and work structure to harness the desired subject' potential (Kleemann, Matuschek, and Voß 2002; Kleemann and Voß 2018). Subjectification refers to companies' structural approach to human labour, emphasising their demand for this labour (Kleemann, Matuschek, and Voß 2002). Internationally, 'subjectification' or 'subjectivity' is understood to mean that the structural nature of the capital-labour relationship is relegated to the background, while the relationship between power, domination, and control is foregrounded (Foucault 2013; Foucault 2017), as is the negotiation relationship between management and employees (Thompson and Smith 2009; Murgia, Maestripieri, and Armano 2016). It acknowledges that strict control and hierarchies can limit motivation and flexibility, leading to a need for greater autonomy. The normative subjectivation of work asserts claims to meaning and self-fulfilment, and to foster self-organisation, management, rationalisation, and discipline. It reflects the 'new spirit of capitalism', which promises autonomy and creativity (Boltanski and Chiapello 2006). This shift towards individuality, facilitated by digital technology, suggests the idea of increased autonomy in identity formation.

The shift toward autonomy in work also raises questions about the balance between individual freedom and organisational control. Autonomy in the work context encompasses self-determination, decision-making, responsibility, and self-efficacy, enhancing worker satisfaction and motivation (Faust 2016). It aims to create a partnership between managers and employees, fostering trust and cooperation (Gilbert and Sutherland 2013). Autonomy cannot exist without some control, aligning employees' activities with organisational goals. Control in organisations refers to a spectrum of 'doing control', which usually includes observing, evaluating and reacting to actions

(Hensen 2020). Control can be conceptualised on the one hand as a technical function to fulfil operational tasks (German: *Steuerung*), or as a management function to achieve corporate goals and put plans into effect. On the other hand, control focuses on monitoring the workforce. So, control can lead to a stable operational order. However, it can also be interpreted as force, surveillance, and restriction, leading to alienation of the workforce. The spirit of new capitalism therefore functions as an ideology, creating new individualised working conditions and concealing alienation behind aspirations to self-realisation (Fuchs 2023). This new spirit of digital capitalism promises autonomy and creativity to workers while maintaining specific controls.

In sum, the interplay between rationalisation, culturalisation, and subjectification is a defining feature of modern society and the evolving workplace. These concepts are reflected in digital capitalism (Törnberg 2023; Fuchs 2023). While rationalisation and culturalisation may seem like opposing forces, they are, in fact, two sides of the same coin, influencing our perceptions of progress, alienation, and the structure of work. Subjectification emerges as a compelling response, emphasising autonomy and creativity within organisations. Digital capitalism as a transformative force is characterised by a cultural logic centred around manipulation through digital control. As an interplay between rationalisation and culturalisation, it shapes new forms of domination and control within society. 'This phenomenon is rooted in the privatisation, digitalisation, and financialisation of market regulation' (Törnberg 2023, 9).

2.1. The Gig Economy and the Suggestive Power of Numbers

In post-industrial societies, characterised by tertiarisation, labour market deregulation, and financialisation, neoliberal reforms have reshaped markets and employment relations. Precarious employment has undercut traditional company structures (Artus 2008). The gig economy embodies the trend towards flexibilisation, financialisation, deregulated labour, and the digitalisation of work, with digital technology adding a new dimension to precarious work: algorithmic management and digital control define today's gig economy (Altenried 2021; Huws 2016). Central to this transformation are digital platforms, which privatise markets (Törnberg 2023, 6), act as intermediaries, and organise a contingent workforce (Srnicek 2017).

Platforms offer various services requiring a stable pool of workers. Access to these platforms is relatively straightforward due to standardised and modular work arrangements, making it attractive to individuals with migration backgrounds facing language barriers. Most platforms use smartphone applications to connect workers with consumers, altering traditional working relationships. However, this shift transfers risks to the predominantly precarious workforce (Schreyer and Schrape 2018; Schor and Vallas 2021). Digital permeation, facilitated by platform companies, their technology as a mediating infrastructure and their relationship with the workforce explains the growing importance of digital platforms.

Platform concepts are based on collecting and using (personal and meta) data as a business model (Schreyer 2022). While practical designs vary, data-driven business models fuelled by algorithm-based data processing are central to Western platform companies. Data aggregation, reassembly, and calculation create scalable subjects, informing rationalisation and subject' potential. Data is the 'symptomatic' expression of the numerical knowledge that becomes dominant with digitalisation. It also reflects an automated or computerised production of knowledge, which develops its own reality and, as such, has a performative feedback effect on analogue life (Becker and Seubert 2020). The collected data also becomes an asset, offering economic returns through controlled access and optimisation of algorithmic infrastructure (Veen, Barratt, and

Goods 2020; Muldoon 2022). This process, known as datafication, involves quantifying nearly all aspects of life (van Dijck 2014), reflecting social power relations and simplification (Levermann 2018; König 2020). The datafication of work performance is essential for algorithmic management, which relies on quantification and categorisation.

Despite promoting themselves as 'neutral' intermediaries producing 'higher' intelligence, knowledge, truth, and objectivity, platforms exhibit an asymmetry between users and data-collecting organisations. Numbers and statistics create an appearance of accuracy and reliability, masking the scale and purpose of their efforts. Personalised social realities based on social criteria shape behaviour (Zuboff 2018, 309) and enable behaviour manipulation. Algorithmic governance is coupled with 'data-behaviourism' (Rouvroy 2013), as aggregated data knowledge leads to internalised power relations and behavioural modification based solely on aggregated data. The resulting digital panopticon[1] is often portrayed positively, with attributes such as transparency, networking, and sharing (Schreyer 2020).

Platformisation refers to the rise of digital tech platforms in society since the 2010s (van Dijck, Nieborg, and Poell 2019; Helmond 2015), marked by the pervasive presence of platform elements in the economy (Eisenegger 2021). This transformation intensifies commoditisation efforts tied to culturalisation processes. Platformisation accounts for a large share of the transformation process, which is characterised by a double movement. On the one hand, as platforms expand into a wide variety of spheres of life, we are witnessing the dissolution of the boundaries of technical infrastructure architectures (Dolata 2018; 2019). On the other hand, we are seeing an increase in the social significance and reach of tech platforms (Kirchner 2019; Kirchner and Schüßler 2019; Kirchner and Wenzel 2020). Platforms are becoming prerequisites for value creation, and their logics of algorithmisation and datafication are becoming societal norms, granting platforms more social power (Ametowobla 2020). These platforms control access, structure user actions, and play an indispensable role in daily life (Piletić 2023). Datafication leads to increased surveillance of individuals and society, blurring the boundaries between private, public, and economic spaces. Data is an instrument of surveillance, particularly in monitoring precarious workers (Lata, Burdon, and Reddel, 2023). The COVID-19 pandemic has accelerated the platformisation of labour, heightening the alienation caused by digital powers in their efforts to impose social control within contemporary capitalism.

2.2. Platforms as Infrastructures and Their Impact on Power Dynamics

The gig economy offers a global labour market. However, gig work is always data work since it cannot be performed without the underlying algorithmic infrastructures. The algorithmic infrastructures of digital platforms facilitate supply-demand coordination and reduce transaction costs in service work. Standardisation and modularisation enable people with varying skill levels to participate in diverse work contexts. This algorithmic infrastructure, termed 'algorithmic management', governs workforce coordination and behaviour through self-learning algorithms (Rosenblat and Stark 2016; Rosenblat 2018). This datafication of labour has far-reaching implications. These digital systems meticulously organise, monitor, and measure work, ensuring the

[1] The concept of the 'digital panopticon,' a ubiquitous surveillance mechanism facilitated by contemporary data technologies, is characterised by its imperceptibility, its reliance on historical, current, and extrapolated future data, and its ability to operate without explicit psychological inducements. The amalgamation of diverse data streams creates an illusion of omnipresent observation, potentially prompting proactive behavioural adjustments.

effectiveness of algorithmic management. In essence, algorithmic management relies on minimal human intervention, operating through a rigid numerical control system (Shapiro 2018; van Doorn 2020). Consequently, it reduces the promised autonomy in platform labour to a mere illusion.

Modularised data on work performance serves the dual purpose of enhancing the functionality of algorithmic management and controlling workers. At the micro level, algorithmic management must efficiently coordinate workers. Simultaneously, it collects, stores, checks, and analyses all activity data, comparing it with past values to predict future behaviour. Proprietary algorithmic infrastructure conceals additional data. Data-driven services provide extensive options for monitoring, controlling, and distributing work processes. At the same time, algorithmic management relies heavily on tracking mechanisms, which are crucial for workforce management. Performance data, working hours, and shifts can be stored and visualised in the app or company databases (Wood et al. 2019; Wood 2021). This technical infrastructure maintains control.

As a depersonalised authority, algorithmic management relies on aggregated metrics from collected data for personnel policy decisions. Algorithmic monitoring and real-time tracking create a knowledge and power imbalance favouring the platform (Walker, Fleming, and Berti 2021). This dual control function exposes hierarchical and asymmetrical power structures. On the one hand, the modularised data on work performance is necessary to ensure the functionality of algorithmic management; on the other hand, this data also controls and monitors the workers. At the micro level, algorithmic management must enable the business model, that is, coordinate the workers efficiently. In addition, all activity data is collected, stored, monitored, checked, merged with other (for example, past) data and analysed. All data, such as the time spent on the platform, the average speed of riders, reaction times within the app, delivery times on average, etc., are constantly compared with past empirical values, and future behaviour is predicted on this basis. However, this is only the apparent data. Much more accumulates, but it is not transparent due to the proprietary algorithmic infrastructure.

Motivation in this context involves nudges and gamification elements (Thaler and Sunstein 2008; Lanzing 2019). These game-theoretical aspects create a facade of self-improvement and autonomy, concealing underlying exploitation. Platform companies initially consider workers' financial needs but may disregard regional conditions or external regulations such as traffic laws. Performance monitoring, nudging, and user data history enhance app utility while scoring introduces behavioural incentives, rewarding or penalising past behaviour. Gamification leads to competitive dynamics among colleagues and behavioural adjustments driven by social pressure and algorithmic control. This is because opaque value generation has real effects on users, who are rewarded or sanctioned according to the numerical value assigned by the company's non-transparent algorithms, and optimise their behaviour based on the metrics provided (Schreyer 2022; König 2020; Lanzing 2019b; Levermann 2018; Foucault 2015).

This tension between autonomy and control reflects the rationalisation and culturalisation in the platform economy. As technology spreads, subjectivity becomes crucial for handling uncertainties. Gamification and performance indicators shape worker subjectivities and create a peer-to-peer system of domination (Törnberg 2023). However, these qualitative factors must be quantified for algorithmic process management, fostering a culture of numbers. Employee apps, tracking measures, and predictive analysis permeate the modern workplace, emphasising control through surveillance and data management. The quantification of qualitative aspects further embeds a culturalised working environment. This shift towards data-driven decision-making conceals

domination and exploitation for capital accumulation. Proprietary algorithms promise objectivity but are challenging to decipher from an external perspective, resulting in non-linear causalities and realities.

2.3. Digital Platform Cooperativism as an Alternative Paradigm of Gig Work

The gig economy phenomenon has generated controversy and ambivalent assessments in recent years. The rise of the platform-based gig economy coincided with the financial and economic crisis of 2007/08. It was initially termed the sharing economy, associated with ideals of egalitarian participation, environmental sustainability, and a move away from capitalism (Botsman and Rogers 2011; Belk 2014; Rifkin 2014; Sundararajan 2016; Goods, Veen, and Barratt 2019). This 'imagined future' of the sharing economy, as well as 'the unredeemed surplus, thus sets in motion a cycle of enchantment and disenchantment' (Kirchner and Wenzel 2020, 112). This applies particularly to the commodification of various aspects of life as a result of platformisation.

The hope of harnessing the potential of digital infrastructures to create an economy of sharing now lies in cooperatively managed platform companies (Scholz 2014; Pentzien 2021; Fuchs 2023; Törnberg 2023). Because:

> Technologies should not be seen as neutral, entirely deterministic, nor as univocal in their effect. Instead, we should look at technology as 'value(s)-sensitive' responding to the material interests and social imaginaries of those that fund, develop and use them. (Bauwens, Kostakis, and Pazaitis 2019, 33)

The cooperative concept aligns with the principles of gift exchange (Mauss 2016; Polanyi 2021), emphasising resource sharing, civic engagement, and diverse synergies in a semi-public space known as the (digital) commons (Wittel 2020). Commoning involves people, shared resources, and negotiated rules of usage. It prioritises sustainable resource utilisation over property rights, fostering cooperation and emancipation (Ostrom and Helfrich 2012; Helfrich 2021) while reducing market dependency. Success here requires a cooperative and needs-oriented approach, and the relational level of togetherness among equals is central. Furthermore, the lived practices can develop an emancipatory potential.

Platform cooperatives represent a public-good-oriented alternative to monopolistic platform companies. Characterised by shared ownership and democratic control, they are considered the 'oldest form of the sharing economy' (Gerling 2018, 35). Cooperative associations are closely tied to the values expressed in their mission statements and encourage identification (Bolsinger 2006, 175). They adhere to four fundamental principles: member ownership, collective self-management, democratic rights, and the distribution of a living income. The self-governance derived from this corresponds to a 'highly demanding conception of order that includes commonality, equality, and voluntariness' (Frank and Lueger 1993, 49, translated by the author). Due to their shared ownership and democratic control, they emerged as a more ethical alternative to shareholder-owned monopolistic platform companies (Zhu and Marjanovic 2021). The subsistence principle contains the purpose of ensuring that all members can make a living from the work. After deduction of all costs, the remaining sum is divided among the members (Voigt-Weber 1993, 186).

According to the International Cooperatives Alliance (ICA), cooperative values such as democratic control by members, autonomy, independence, cooperation, and community are the core of co-ops. Scholz (2014) proposed additional principles for platform cooperativism, adapting to the specifics of digital labour. These include decent pay,

transparent and portable data, co-determination, legal protection, recognition, freedom from excessive supervision, and the right to log off. The platform cooperativism movement seeks to work towards democratising the creation and distribution of value in digital capitalism. It is essential to differentiate between legal and social forms of organisation within platform cooperativism. Not all legally defined cooperatives embody cooperative values, and vice versa. As an interface between the market and civil society, the movement oscillates between activist and entrepreneurial orientations. In political terms, it is more reformist than revolutionary (Pentzien 2021, 276). Nevertheless, there is the hope that cooperatives have the potential to shift the balance of power within capitalism (Brandl 2021).

Classic platform companies dominate the current shape of the gig economy. This economy, as described above, is characterised by precarious working conditions, economic reliance on platforms, and significant control exerted over workers. Addressing these challenges, Bunders et al. (2022, 2) propose four cooperative models, detailed in the table below.

	Members are self-employed	**Members are employed**
Cooperative does not own platform	Producer cooperative that does not provide gig workers with labour rights, and does not own a matchmaking platform (e.g. https://decooperatie.org/)	Worker cooperative that does provide gig workers with labour rights, but does not own a matchmaking platform (e.g. https://smartbe.be/)
Cooperative owns platform	Producer cooperative that does not provide gig workers with labour rights, but does own a matchmaking platform (e.g. https://taxiapp.uk.com/)	Worker cooperative that does provide gig workers with labour rights, and does own a matchmaking platform (e.g. https://www.upandgo.coop/)

Table 1: Cooperative types by platform ownership and member employment status (Bunders et al. 2022, 2)

The first model, represented in the top row, involves platform models financed by venture capital, in which gig workers hold membership status, granting them access to various benefits. While this model mitigates the issue of precarity, it fails to alleviate economic dependence on the platform. In contrast, the second model, outlined in the bottom row, describes 'real' platform cooperatives. Here gig workers, while maintaining formal independence, influence the platform's operations through their membership. Although economic dependence is less pronounced in this model, precariousness remains a concern, as discussed in section 3.2. The logical progression from this model is the permanent employment of members by the platform. This approach circumvents the problems of precariousness and economic dependency, offering a more stable and sustainable alternative.

In the discussion below, the preceding points will be elucidated through the examination of two distinct case studies, similar to Saner, Yiu, and Nguyen 2019. The first case study is a platform company operating within the food delivery sector, which will illustrate the influence of precarity and economic dependence on the autonomy-control dynamics experienced by gig workers. The analysis will then shift focus to a platform cooperative comprised of solo self-employed members, to assess the impact of equal relationships on the autonomy-control dynamics within the gig economy.

3. Between Autonomy and Control in Gig Work

This section examines the commercial and cooperative facets of the gig economy through two contrasting examples in the bicycle courier business. The first case highlights a commercial platform company specialising in regional, national, and international meal delivery, via bicycle couriers managed through algorithmic coordination. The second case centres on a local bicycle courier collective striving to break free from incentive-driven policies and discipline by implementing automated processes. Both cases share the utilisation of algorithmic infrastructure for work coordination.[2]

The analysis delves into the influence of algorithmic infrastructure systems on communication, autonomy, and control within these food delivery contexts. The operational, monitoring, and quantification practices differ based on the platform company's orientation. Aspects of rationalisation and culturalisation, as part of these companies' daily operations, yield varying levels of autonomy and control for the workers, and differing methods of (self-)discipline and employee monitoring. This leads to tensions, ambivalence, and challenges.

3.1. Methodology

The qualitative study used interviews – conversational interactions characterised by immediacy and reciprocity – as its primary method of data collection. Transcripts containing narrative passages were created, offering insights into the context of the interviews. Grounded theory guided the analysis, emphasising inductive category formation and comparative analysis.

Two qualitative case studies from the bicycle courier industry within the platform economy were used to compare and contrast organisations with the greatest possible. The data collection period in company 1, the commercial food delivery platform, lasted from 2017 to 2023 and included document analyses (newspaper articles, homepage, annual reports, social media), as well as the evaluation of a closed chat group for bike couriers from this company and 12 semi-structured interviews with 18 riders from three different locations and all hierarchy levels. Company 2, the bike courier collective, is presented as a self-managed company with collaborative management. Due to initial access difficulties, the investigation period only extended from 2019 to 2021. There was thus considerably less data material for this company. This explorative study is based on web content, project documents, a four-hour face-to-face conversation with two members of the collective, and five telephone interviews, as the planned

[2] The empirical data presented here were collected as part of a qualitative study in the context of the Hans Böckler Foundation-funded project: 'Digital Project Communities as Innovation Incubators' (see Schreyer/ Schrape 2018; 2021; Schreyer 2019, 2020) from 2017-2020. The following analysis was partly developed within the framework of funding from the German Research Foundation (DFG) - project number 442171541 (DFG Priority Program 2267: Digitalisation of Working Worlds).

participant-observation had to be abandoned due to the COVID-19 pandemic. In total, eight interviews were conducted in English.

The data analysis used grounded theory (Strauss and Corbin 1996; Glaser and Strauss 1998). Here data analysis progressed through several steps, beginning with document analysis, which informs the development of 'natural' data categories. Inductive categories were utilised to explore the layers of meaning in gig work phenomena, acknowledging the inherent limitations in the study's validity due to resource constraints. The iterative processes of data collection and analysis inform each other, with initial interpretations shaping the subsequent selection of interviewees. This 'theoretical sampling' guides the process by iteratively selecting and analysing cases. Concepts are generated and organised into categories, with a focus on understanding speakers' intentions and layers of meaning. Coding plays a crucial role, with open coding used to name and categorise phenomena, followed by a gradual process of refinement. The development of structuring dimensions leads to the formation of a preliminary category system. Although theoretical saturation is not achieved, the analysis prioritises a general exploration of the field over theory production. In keeping with the methods of grounded theory, the following comparison is also based on an analysis of similarities and differences.

3.2. Gig Work on a Multinational Platform

An international food delivery company entered the German market in 2014 by acquiring a local brand. In the years that followed, the parent company expanded both internationally and nationally. It eventually purchased the remaining delivery services on the German market after Deliveroo announced that it would leave Germany. This gave the company both market leadership (as of 2019) and a monopoly on food delivery (the latter only for a short time, as the food delivery field is very volatile and other competitors have since entered the market).

Employing approximately 7,000 to 10,000 couriers, who work under the algorithms and 1,000 to 2,000 employees, who work over the algorithms in Germany, the company relies on unskilled work with a high turnover. It is important to note that couriers in Germany are employed, distinguishing them from couriers in other countries. The company's market leadership is based on a careful analysis of the issues faced by Foodora and Deliveroo. Deliveroo had problems with sham self-employment, while Foodora struggled to prevent worker representation. To gain a foothold, the company promised e-bikes to couriers and opted for direct employment. The aim was to enhance brand visibility and discourage restaurants from establishing their own delivery services.

The company presents itself as a socially responsible business, emphasising sustainability, food quality, and employee empowerment. Despite this self-presentation, a clear distinction is made in communication, treatment, and performance between people who work above and below the algorithm. The former group, the 'digital aristocracy' (Fuchs 2023), includes all those who work in the office (with gradations in value) and who program, maintain, or own the algorithm. In contrast, those who work below the algorithm constitute the 'digital proletariat'. These workers are not even employed by the company itself, but by a limited liability company set up specifically for this purpose.[3] This is not mentioned in external communications; on the contrary, the

[3] In this case, the division is even more general, since it is mainly about those who work in the office as opposed to those who work on the street. While office employees in start-up settings enjoy various benefits within working hours (e.g. canteen allowance, additional vacation

corresponding rider pages suggest that they are part of the larger team. Nor do the team events advertised on the website give any indication of this segregation. The information page for prospective riders talks a lot about the care, services and additional benefits the company offers its couriers. It also emphasises the flexibility the riders enjoy and the low threshold for entry (ID, insurance, and a minimum age of 18). Communication with management is another area of inequality. While office staff communicate through the Workday platform, riders experience delays in responses, if they receive any at all.

The riders are presented as key performers in the company's media communications. Yet they report that this kind of appreciation is not shown to them in practice. On the contrary, they state that the prevailing management practices neither reflect the value supposedly attributed to the workers nor perceive them as a 'real' part of the company. This was also repeatedly evident in court disputes over benefits that were taken for granted by people working in the office but not extended to those working on the road.[4]

> 'Community' is a huge speech bubble [...]. However, there are team events organised by the employer, which take place once a quarter. That's for all riders, you do some kind of outdoor activity or go to a pub or a club, and then you meet up and have a rider party or rider event and that's where you get together. The problem is that it's once a quarter, so every three months it's completely different people you meet there. (Rider B 2018)

The promised team events do occur once a quarter, but due to the high turnover among the riders, these are not perceived as a team-building measure. While events like pub nights are organised for the digital proletariat, there are expensive ski and pool parties for the digital aristocracy (Briegleb 2022).

According to the riders, another point of conflict marking the division within the workforce is 'limited' communication. Couriers do have various options to contact management digitally (messenger, ticket system, email):

> The riders are also treated like customers. Writing tickets to the personnel department. And they are kept out of the company. The aim is to control them remotely and they [the riders; J.S.] are supposed to provide the cell phone data, and the customers do that, too. (Senior Rider Captain 5, 2020)

Even for acute issues, however, it takes some time to get a response, and sometimes no response is given. For the office staff, on the other hand, the introduction of the software 'Workday' (only for office staff for the time being) has virtually streamlined communication through the use of artificial intelligence and established an extensive with an extensive feedback culture. As a service solution, the software promises to listen to employees and give them a voice, thereby increasing employee involvement. According to Workday's own self-description, its products primarily support the challenges of the changing world of work in the respective organisation. They free up the capacity to focus on the 'human dimension of work' (Workday 2023) by actively listening and taking the needs of employees seriously. One module, in particular, is based

days, etc.), these regulations do not apply to riders. On the contrary, they had to go to court to win their right to work materials in addition to the branded functional clothing.

[4] While the riders do not receive any meal allowances or extra leave for extraordinary events, this is a standard for the office workers.

on various people analytics functionalities, which enable the analysis of large data sets and help to predict employee behaviour. In particular, it uses personalised surveys and machine learning technology to provide insights into the workforce and 'turn[s] insights into action that drives engagement and growth'.[5] By using natural language processing, the application claims to be able to detect meaning from feedback data. This software seems to represent the link between rationalisation and culturalisation in the world of work. The company's General Works Council[6] prevented Workday from being introduced for riders and stipulated how the software could be used for office employees in a company agreement (cf. General Works Council Agreement on Workday HCM & Finance 2021).

For the courier, algorithmic management plays a central role in daily work through the company's app, standardising processes and tracking data. However, algorithmic management is not fully automatic; it mediates management decisions through the app, but regular interventions by the management are necessary:

> Personnel planning is first carried out by the algorithm, but then there is also a business planner team. The guys who optimise the personnel planning afterwards. These are the HR department and the people from local hubs. (Senior Rider Captain 6, 2022)

Nonetheless, algorithmic management has the capacity to control many workers with a relatively small number of people working above the app.

> With the combination of location, route, and time you can evaluate and create entire profiles of your employees. And you can also look at your operational business, at where the weaknesses are, because you can triangulate the data from several riders. (Senior Rider Captain 4, 2020)

While riders lack full access to order information, impacting their qualitative input, the standardisation of work processes involves full tracking of each courier's status and order history and the bonus thresholds reached. Social knowledge about the workforce can be derived from this data, increasing the company's power over them. The quantitative control mechanisms integrated into the workflow through algorithmic management are flanked by qualitative measures such as gamification and nudging. For example, the Soober app works similarly to the Workday app, with a colour guidance system based on real-time and predictive analysis, and can potentially change behaviour.

The strictly standardised and controlled work environment offers little worker participation. They are the object of rationalisation. The lack of a workplace and the absence of a company social order constitute a further disciplinary dimension that pushes alienation to the extreme. Moreover, the heterogeneity of the couriers makes it difficult

[5] See: https://www.workday.com/en-us/products/employee-voice/our-technology.html (accessed June 2, 2023).

[6] The implementation of employment contracts paved the way for worker participation in company decision-making based on the principle of co-determination. In Germany, the works council is the central institution of co-determination, while in other countries, it is often the trade union. The employees elect the works council. It has the right to be informed and consulted on company decisions because the system is based on the idea that employees are not just a factor of production but also stakeholders in the company. The works council can also make proposals and negotiate with the management on behalf of the employees.

to overcome this atomisation. However, the advertised autonomy of riders and the practice of algorithmic management have led workers to unite – regionally, nationally and internationally – to voice their displeasure (Schreyer 2021; Tassinari and Maccarrone 2020; Healy and Pekarek 2021).

Attempts to establish works councils[7] faced resistance but ultimately succeeded, providing a space for collective organising.

> We have a sort of parallel structure here, the riders are actually outside the company, although the works council has been established inside. And then you first have to assert your rights everywhere. (Rider 7, 2020)

Establishing works councils is vital to creating a space on the ground for further organising. Works councils are a traditional institutional power resource. And it was hoped that they could also be a solution for the gig economy. Because workers' interests were explored and physical meetings initiated via digital communication. This helped offset the conflict between management and works councils, characterised by intimidation, the suppression of dissent, management ignorance, and the failure to share information in a timely manner.

> We have this works council management team [contact persons for the works councils], so at the beginning, you don't hear anything from them, they first get an induction into the company and then they get seminars on conducting talks and union busting and so on. And suddenly, as if they had learnt to speak, they are able to use rhetorical phrases and distortions, like politicians on television, to talk you out of whatever you have in mind, so to speak. (Senior Rider Captain 4, 2020)

Some meetings between management and the works council were terminated by the police, as documented on social media. Currently, there is a variety of arrangements for the representation of the collective. In recent years, the various institutions for the representation of collective interests have increasingly organised the digital proletariat and helped to build up a countervailing power to algorithmic management and the digital aristocracy. Works councils, in close cooperation with the union NGG,[8] have even demanded a collective agreement and reinforced their demands with several strikes. These developments may shape further strikes as workers seek to strengthen their collective identity and turn it into a meaningful movement.

3.3. Gig Work in a Platform Collective

This platform cooperative was established by six individuals who had previously worked at Deliveroo. Their goal was to avoid management based on algorithmic governance. This initiative began in 2016 and became official in December 2017. They aimed to maintain the advantages of independent work, characterised by self-

[7] Germany has extensive legislation on co-determination, which places employee representation within labour law rather than company law. Works councils are the focal point of co-determination, unlike in other countries where it is often the trade union.

[8] The Food, Beverages and Catering Union (NGG) represents various sectors, including the hospitality industry and food production as well as Lieferando, a food delivery service. In 2023, the NGG recorded 187,679 members, over 400 strikes and a 1.3% increase in membership (see: https://www.ngg.net/presse/pressemitteilungen/2024/gewerkschaft-ngg-zahl-der-mitglieder-steigt/) (NGG 2024).

determination and self-organisation while addressing issues like poor working conditions and courier atomisation. The cooperative is entirely self-governed and self-organised, aiming to drive social change through digital technologies that empower participation and decision-making in all aspects of their business.

The platform cooperative, which is very small compared to the commercial platform companies, consisted (in January 2021) of 15 people, three of whom act as shareholders in the GbR[9]. They avoided the use of venture or private capital to maintain their independence.

> This is the downside of not working with investors and money from outside. Because if you only operate with the money the company earns you can only do little baby steps. And all those things we actually want, we would all be able to pay us money for a certain amount of hours every month, to actually see us as employees but to come there we do need to grow as a company. And like, you know, that's the point, no loans and nothing from outside to like to achieve that. And that's the point, we have to grow as a group of people, we have to grow as a company. (Bike Messenger 5, 2020)[10]

Therefore, all the participants have to pay their own expenses and bring their equipment independently. Members share the work, profits, and risks. The collective's profits cover its running costs and allow for risk-based payment for members. At the time of the analysis, the cooperative paid its members an hourly wage equal to the minimum wage. At the same time, it made situational decisions about who would receive what compensation for what work, based on the profit generated. The collective enterprise of solo self-employed workers did not award formal employment contracts in 2020.

> I mean there's some kind of a verbal contract which could be seen as a social contract you know like you have and as soon as you say you dedicate to a group of people and to work then you say you dedicate and then you have to deal with the consequences of like not showing up anymore, just like being gone by not saying anything, but it's like no one is pinned to working with [Company 2] by having a contract. (Bike Messenger 6, 2020)

Instead, there was an unwritten social contract that everyone implicitly agreed to when they joined the project: because the collective is based on active participation, communication and commitment beyond paid employment is taken for granted. The cooperative operates on a foundation of grassroots self-governance, guided by principles like identity, democracy, and living income (subsistence).

> Having strict ethical rules is always nice for your karma or something like this which exists, but usually has an impact on business development. […]. Sure, that is what we basically stand for, that we don't work with everyone. (Bike Messenger 7, 2021)

> Every member of the collective has an insight into every aspect of the collective. So, our financing is open to everyone. How much each one of us earns is also

[9] The legal form of this cooperative is the Gesellschaft bürgerlichen Rechts, a partnership organised under the German Civil Code (BGB).

[10] As mentioned in the methodology section, the following interviews were conducted in English, but none of the interviewees was a native speaker.

> known, because we put the hours down. How much work or how much time does someone spend on the road, or how much does someone spend on dispatching? So, we are truly equal. Who spend some time acquiring customers and so on. Everything is open, there is no mystery. It is not like you are working in an office and you don't know the person who you hire and there is a senior and a junior. So, we are actually equal. And there is no boss, there is no person who stands above and that's not like in an office. And we make all the decisions collectively. We have a plenary every two weeks. We write down everything. The topics of the plenary, we want to discuss. We are working on the decision we are making. So eh, yeah, I think it is a privilege to work in such a small group." (Bike Messenger 5, 2020).

Eight members work full-time for the collective, while the others engage in different professional activities but actively participate in meetings and have voting rights. Of the eight members, six people are involved every day, either on the road or working from their own homes as dispatchers. In addition, one person works exclusively in accounting, and the eighth position is for those members with other professional arrangements, who have little time to spend.

The cooperative embraces open communication and engagement as part of its ethos because communication is the basis of the collective. The lingua franca in the collective is English since not all members speak German. Overarchingly, the collective focuses on what people inside (and outside) the collective need and what they can provide. The cooperative's goal is to bring about a change in consciousness and initiate social change that will lead to a more social and less exploitative world of work.

> I think it is that people see more and more that there is no need for a van or a car to transport 50 kilos or so. All this bike messenger can do this. And it is cheaper and emission-free, it is ehm and maybe it is a tiny tiny difference, but instead of a car in this place somewhere it will be a bike messenger. But even this tiny difference is worth fighting for. And that was also a main idea. To provide people with logistic services, which reflect the change in society. (Bike Messenger 4, 2020)

The cooperative seeks to empower workers, allowing them to shape their own work rules and conditions. The plenum thus functions as a collective management that builds legitimacy through bottom-up decisions. In addition to the internal coordination processes, the collective is constantly exchanging information and ideas with other cooperatives. It works on the conviction that labour policy changes can be achieved through the overarching cooperation of individual and collective actors.

By encouraging all members to communicate, the cooperative explicitly aims to set itself apart from the commercial work contexts of the gig economy, in which the organisation of work is predetermined by centrally defined and technically mediated rules, over which employees have no influence. The unique feature here, however, is that the software is programmed by CoopCycle, the 'cooperative of cooperatives'. This is a common-good-oriented bicycle courier network founded in France in 2016 (Spier 2022), which shares its software exclusively with democratically constituted collectives (Schreyer and Schrape 2021).

CoopCycle's software provides decentralised infrastructure for local cooperatives but maintains human decision-making over central algorithmic management. The cooperative gives feedback to CoopCycle and requests adjustments to adapt the software to its own needs.

> Gm [founding member] is also involved in this coop platform, which is called CoopCycle. It is an urban French-based ehm cooperative. It is a cooperative called cooperative, it is a cooperative which includes other cooperatives from around Europe and provides them with a network and provides them with ehm, a computer program with dispatching on the platform. (Bike Messenger 2, 2020)

Since 2018, the cooperative has been an active member of the public interest bicycle courier network CoopCycle, which develops overarching legal and technical frameworks for its members. Like the other cooperatives affiliated with CoopCycle, the collective has no direct access to the software code. But constant feedback loops through an online portal and immediate support in case of problems means that it is always possible to adapt the software to their own needs and thus develop it further.

> If you use CoopCycle, then you are CoopCycle. You have a right to co-determination. We can say from our side what is important for further development. And then, of course, we push our things. (Bike Messenger 3, 2019)

The developers at CoopCycle usually deal with the relevant problems promptly; a solution is often implemented within a few minutes. In addition, there is an online portal for further development of the software, where all CoopCycle users can submit change requests for discussion. These are then evaluated by the community and implemented on a case-by-case basis. Errors in the app that could lead to a monetary loss are prioritised.

Although the basic design of the CoopCycle app allows live tracking to follow the work of the riders in real-time, the collective has deliberately chosen not to use this function (Fiedler 2019). This is because live tracking is, in their opinion, the couriers' 'prison'. It increases the stress level for riders since the customers tracking them expect them to keep moving and cannot tell when they need a break or have a flat tyre. The CoopCycle application allows riders to decline orders, and has no quantified and aggregated performance data and no gamification or nudging. However, full-time riders use the tracking app Strava. This self-measurement is voluntary and primarily serves as an exchange between 'bike geeks', independent of the collective. But this ignores the fact that the comparisons among riders and the public sharing of the performance data that they enter establish a reality sui generis. Because Strava motivates its users with reward and warning systems, it turns a lonely form of exercise into an exciting game in which friends and unknown users (based on age, location, gender, similar performance data, etc.) can be involved (Lanzing 2019). These game elements encourage users to constantly measure themselves and compete with others. Game-theoretical factors such as leaderboards based on performance data and rewards such as awards and badges are designed to motivate users and encourage them to constantly log in and improve their performance.

While the cooperative's day-to-day work is inconceivable without the CoopCycle app, the algorithm is not the sole central coordination mechanism, as is the case with commercial delivery platforms. Instead, the functioning of the cooperative enterprise is based on the interplay of diverse digital communication tools, with personal coordination possible at all times. Whereas in the case of the commercial platform company, access to gainful employment (as well as to the use of the service) only functions via the previously created account, the criteria for admission to the collective are tied to certain principles and goals as well as the intrinsic motivation to participate. Communication as the central coordination principle also relies on the jointly shared and used resource of needs-based employment. This only works sustainably for all members

due to an elaborate and long-negotiated system of rules. These jointly established practices ensure community building based on social similarity because all members share a high intrinsic motivation to participate. The aim is to enable all members to combine life and work according to their respective needs. Trust, solidarity, and recognition are indispensable to meeting these goals. However, this creates a culture of constant involvement, which can lead to individual overload and dissolve the boundaries between work and private life.

3.4. Algorithmic Management, the Interplay of Autonomy, Control, and Subjectivation

In both case studies, the algorithmic infrastructure is a central pillar for work coordination. It is pivotal in shaping how these platforms organise and carry out work. This algorithmic system takes control of all coordination tasks and activates work steps sequentially, enabling easy participation by all the parties involved. Algorithmic management is a crucial component, albeit with distinct consequences for each model. In the commercial variant, the associated standardisation does not allow any deviation from the predefined paths (van Doorn 2017; 2020; Duggan et al. 2020). In this commercial setting, fully automated and modularised work coordination significantly limits individual autonomy, turning couriers into monitored variables subject to strict performance controls.

Algorithmic governance influences behaviour through incentives and rewards, with the aim of addressing individual motives and desires (Bröckling 2016; 2017). While the algorithms' mode of operation remains opaque to the workforce (Goods, Veen, and Barratt 2019; Levermann 2018; Wood et al. 2019b), algorithmic management can perform a gatekeeping function and establish an extensive control paradigm through data management. The problem with using software products such as Workday lies in the complexity of collecting and aggregating the data, as it includes emotional tracking (Doellgast 2022).

The commercial platform's algorithmic management tightly controls all aspects of work, leaving riders with little autonomy and no room for deviation from predefined paths. Here, algorithmic management dominates employee management, restricting worker autonomy through technology-mediated rule-setting and modularisation (Veen, Barratt, and Goods, 2020; Kellogg, Valentine, and Christin 2020). Although workers experience some autonomy without a physical employer, algorithmic management remains a constant presence throughout the work process. This corporate platform architecture reinforces the power asymmetry between capital and labour and increases the pressure on the German model of industrial relations (Kirchner 2019). However, autonomy and control are two sides of the same coin. Hence, an imbalance causes resistance, so the self-organised resistance on the part of the riders was not only a logical outcome but led to a revitalisation of the union NGG.

While communication is limited at all levels of the digital proletariat, collective communication is the all-encompassing principle of coordination (Schreyer and Schrape 2021). The rider and the dispatcher are communicatively linked and can thus always reach other agreements that may counter the algorithmically predefined decisions (Spier 2022). Unlike in commercial platform contexts, face-to-face and digital communication provide an essential functional basis for the collective, which consists of equal partners who can take over all tasks and functions at any time if they want to (cf. Bike Messenger 5, 2020, quoted above). The accompanying transparency ensures mutually trusting work relationships and self-determined ways of working without formal hierarchies.

> Even if you, ehm, even if you always try not to have a hierarchy in collectives, it doesn't work one hundred per cent. Some people are longer on board and are therefore more respected, and new people feel like they can't somehow contribute their opinion. (Bike messenger 5, 2020)

Implicit hierarchies have emerged, based on personality, duration of affiliation, communication activity, etc. But members have equal participation and decision-making rights. Communication is all-encompassing, and the cooperative aims to empower members by distributing creative power and allowing rule-setting through consensus or majority vote. Live tracking is deliberately rejected to create a less stressful work environment (Schreyer 2021a). Unlike the commercial platform, face-to-face and digital communication play essential roles in the cooperative, fostering trusting working relationships without formal hierarchies. All members enjoy equal rights of participation and co-determination.

> It requires a lot of communication, but you have to respect the plenum as the authority, then it works. (Bike Messenger 3, 2019)

The cooperative counteracts the atomisation of riders in the classic gig economy by using multiple channels of exchange. The technical infrastructures chosen by the cooperative facilitate internal coordination and agreement. They do not, however, shape the fundamental structure of the collective and they remain an object of social negotiation. The multilayered technical infrastructures, which cannot be reduced to an algorithm that coordinates everything, reduce the susceptibility to errors since there are always fallback options available in the event of disruptions. While the infrastructures used remain a black box, all members of the collective can interact directly with the developers of the CoopCycle app to report bugs in the platform architectures and suggest further developments.

> We do our daily operations with Coop. We dispatch with Coop. And in the end, I think, like the way Coop works, it is basically, we give them feedback and they implement in their system what we actually want them to implement. So, ehm, like: They feed us and we feed them. So, that's how we build a ehm, I don't want it to be called a bubble, because the bubble usually like blister after some time, but we create our own system in this wired digital capitalistic system in which usually the simple worker doesn't have any influence. (Bike Messenger 4, 2020)

The data collected through the software and the aggregation of this data have created new possibilities for control and monitoring, which show that employers' power has dramatically increased compared to the power of employees. The real-time evaluation of feedback, scoring, and the comparison of key figures allow employers to determine the workforce's morale based on the numbers and, subsequently, to implement concrete measures. The quantified presentation of qualitative data conveys the impression of an objective view. This feedback culture aims at the subjectification of labour and results in employee activation through technology designed to increase satisfaction and productivity, thus concealing the alienation experienced by workers. For the riders of the commercial enterprise, this means that any accident, conflict, or delay could also be taken as a reference for future evaluation, discipline, and control. In contrast, this is not equally true of the cooperatively managed enterprise. In the case of the collective, behavioural conditioning is 'voluntary' and external to the company. Since Strava's algorithms cannot know that the members of the collective are self-measuring in the work

context, and that the nudges encourage them to improve performance, it may well be that the incentives encourage riders to ride faster and more dangerously. Regardless of the design and consequences for subjects, it enables real-time data collection, combination, and analysis. This provides a personalised set of options based on behavioural predictions and is thus highly likely to evoke the desired behaviour.

> We do this [gamification; J.S.] with Strava but this is completely different. It is not linked to the business. There is no ranking stuff in Company 2. The only gamification is this gamification we do ourselves by ourselves, but not something work-connected. There is no ranking of how many deliveries people did in a month for Company 2. Because it is not about being the best in town. (Bike Messenger 2, 2019)

As an intensification of existing rationalisation tendencies, the automated mechanisms for quantifying and standardising work practices – to coordinate workers and control their behaviour – appear objective. The stored numbers (working hours and shifts, digital participation, interactions, and individual performance data) generate a 'bigger picture of the truth'**.** The opportunities presented have an implicitly obligatory character. The suggestive power of numbers and the constant comparison with the app's key figures certainly generate pressure, which is reinforced by gamification and (hyper)nudging. While these tools are often praised as encouraging autonomy and agency, fostering employee empowerment, participation, and even well-being, they also exercise 'algorithmic control' (Kellogg, Valentine, and Christin 2020) over employees by guiding and evaluating their performance. In this manner, such applications produce numerical knowledge that makes it possible to describe, compare, and prescribe employee behaviour.

> The whole thing is based on some kind of competitive thinking. That's, uh, complete nonsense, because we're in traffic, you can't just turn the traffic light to green as you need it. You have to be alert all the time, you have to see what the weather is like and where the people live, they live on the fourth floor, that's where you get tired, exhausted, during work. And then perhaps you're no longer focused. And then it's easy to create a competition out of it. And I found that very cheeky, shortly after I became team leader, so it was impertinent what you ask of people. It's probably because people don't know any better and they don't know how to defend themselves. And, because it is such a competition, there are also very ambitious people in team leadership positions. Or even our site manager is also like that. (Senior Rider Captain 1, 2018)

The rejection of algorithmic disciplining allows the members of the community-led platform greater scope for action, but they face other problems:

> Also working collectively as much as it's very rewarding, but there are also different problems that you encounter, it's not all sunshine and rainbows, because there are also, of course, there are always small things that happen between people and we have to clarify that and so on. It's about the individual members too. Arguments can get personal. You always have to like... I mean maybe that's one of the disadvantages compared to like the standard capitalistic structure where your boss is your boss and it's not linked to you. I mean we all, we grow up with hierarchy. So just to throw yourself in a pool of non-hierarchic systems and then say, 'You know, we're all equal and we're getting rid of the things we've

> internalised for years' is not easy. So then there are arguments and then you have this like personal bullshit going on. And when your boss is your boss, he's an asshole, but he's your boss and he tells you what to do. So as you said, it's not only rainbow colours. It's demanding as well. It's also demanding. But, we have a basis, trust, and stuff. (Bike Messenger 1, 2019)

However, increased autonomy comes with blurred boundaries between work and personal life. Moreover, the precarious nature of collective work contexts operating in capitalistically structured markets appears problematic. It is true that the members of the collective have freely chosen their conditions of employment and have consciously decided on the advantages and disadvantages of their activity in individual processes of deliberation. However, the collective can hardly influence the general market conditions, which directly determine the project's scope of action and can quickly threaten the independence it has gained (Bierhoff and Wienold 2010; Pongratz and Simon 2010).

> All work is paid, in any case. Of course, there's a lot of extra work, and there are also a lot of people who don't write down their hours for the extra work. That's a personal decision. (Bike Messenger 2, 2019)

In particular, undercapitalisation in the early years posed an enormous challenge (Hardwig and Jäger 1991). In the initial phase, the willingness to perform unpaid work was high. Overall, however, the collective's focus is not on a profit maximisation strategy but, if anything, on a profit optimisation strategy (Voigt-Weber 1993), aimed at creating new spaces for trusting social relationships and for self-development and self-determination.

> The plan is to, at some point employ working for Company 2 when the business model changes it, at least on the paper. But now, it is like it is always for freelancers. You work and usually, the work you do is paid well, so it includes all the social services and holidays. Ahm, Company 2 is still a young company. It is definitively dedication and not have, having an accident. (Bike Messenger 4, 2020)

At least in part, then, the cooperative overrides standard capitalist logic because the focus is not solely on profit maximisation but also on addressing non-economic needs such as job satisfaction, self-realisation, and co-determination. This social rationality, in contrast to purely economic rationality, focuses on social utility, ecological compatibility, and the members' needs. On the one hand, this leads to a high degree of identification with the collective. On the other hand, it is accompanied by a moral pressure to attend to the concerns of the collective even beyond regular working hours. It blurs the lines between work and personal life as part of the claim of a holistic approach to work and life.

In summary, algorithmic management profoundly impacts platform operations, but its consequences for workers differ significantly between commercial and cooperative platforms. These insights highlight the need for a nuanced understanding of how algorithmic management shapes the gig economy and its implications for workers and society.

4. (Im)Balance of Autonomy and Control

The rise of digital capitalism and platformisation has transformed the world of work. The coexistence of commercial platforms and cooperative alternatives in the complex landscape of digital capitalism and platformisation shows how autonomy and control intersect within the modern workforce. Examining specific examples within the gig economy, we encounter two contrasting narratives. On the one hand, we find that commercial platform companies are often characterised by top-down management, algorithmic governance, and a focus on profit maximisation. These entities dominate the gig economy and exert significant control over their workforce through data-driven surveillance and performance metrics. This tight control, primarily determined by algorithmic management, has led to partial resistance. In order to alter the autonomy-control balance somewhat in favour of gig workers, the idea of establishing institutionalised counter-power structures has gained traction. These initially emerged in the digital realm, mostly on social media platforms, separate from the work platform. To ameliorate their precarious situation and economic dependence, gig workers subsequently established works councils as structures for interest representation, with the assistance of the NGG trade union. These councils now endeavour, with varying degrees of success, to advocate for the concerns of gig workers and thereby shift the imbalance of control and autonomy somewhat.

On the other hand, cooperative platforms, driven by the vision of reshaping the digital economy into a more equitable and participatory model, provide a compelling alternative to traditional commercial platforms. The cooperative model hinges on collective ownership, democratic control, and shared responsibility, embodying a commitment to values like autonomy, cooperation, and community. Here algorithmic management functions not as a central control authority but rather as a digital task list. The software developed by CoopCycle can be seen as an underlying structure that ensures smooth interaction between dispatchers and bike messengers through additional technical applications. The autonomy of the members, established through institutionalised relationships such as plenum decisions, is deemed more important than the control function, which is why features such as live tracking or gamification are absent. In this case, the autonomy-control complex leans more towards autonomy.

The divergent outcomes in these two labour models underscore the critical role of institutionalised relationships. On commercial platforms, these relationships often emerge as a result of labour struggles, ultimately serving as a countervailing power to algorithmic management and the ‘digital aristocracy’. Works councils and collective representation of interests have proven essential in balancing the power asymmetry and pushing for better worker protections. The study highlights the need for labour activists to adapt to the digital era’s unique challenges. It underscores the role of institutionalised relationships as a countervailing power in addressing the power imbalances within platform companies. As workers navigate the challenges posed by algorithmic management and platformisation, labour activists may play a crucial role in educating workers about their rights and providing advocacy support when disputes arise.

Conversely, institutionalised relationships are deeply ingrained in the collective ethos of cooperative endeavours. They foster trust, collaboration, and decision-making grounded in the community’s interests. The cooperative-led platform places communication at the forefront of its operations, emphasising autonomy, cooperation, and community-building. Members of the collective have equal participation and decision-making rights, and technical infrastructures facilitate internal coordination while remaining open to social negotiation. Fallback options reduce susceptibility to errors, and

members can interact directly with developers for platform improvements. The rejection of live tracking fosters a less stressful work environment for riders.

Nevertheless, both labour models grapple with the subjectification of labour, albeit in distinct ways. While algorithmic management in commercial platforms exercises control through data collection and behavioural incentives, the cooperative model emphasises autonomy but faces challenges in delineating work-life boundaries and addressing market-related constraints. In spite of this, the success of cooperative-led models can serve as an example of how to create more equitable and worker-centred gig economy platforms. It may also inspire discussions on the societal benefits of alternative labour models prioritising worker agency.

In conclusion, the presence of institutionalised relationships as countervailing power structures plays a pivotal role in shaping the autonomy-control dynamics within platform companies in the era of digital capitalism and platformisation. These relationships are instrumental in safeguarding worker rights, influencing the balance of power, and facilitating collective organising. The interplay of autonomy and control remains central to understanding the implications of platformisation for workers and the future of labour.

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Involution, No Revolution: Technocapitalism and Intern Labour

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Abstract: The global economic downturn due to the pandemic has resulted in shrinking the digital market in big economies such as the USA and China. After the pandemic, many of the major tech and internet-based companies had to take action to reverse their declining balance sheets and look for ways to financially rebound. Illustrated in this paper is how these tech firms in China could further advance their economy by minimising their paid manpower by working with/under the education system and inventing new temporary intern positions as semi-(im)material labour to expand their workforce. Based on our ethnographic work and interviews with interns, we elucidate the case of a Chinese tech intern, which exemplifies what we refer to as *involution*. Involution is a process by which the new generation is induced to accept a much more precarious economy as a result of nominal pay, yet can nevertheless survive, meet their daily needs and dwell in big cities, rather than engaging a radical change or revolution.

Keywords: involution, revolution, technocapitalism, digital capitalism, tech firms, internship, labour, precarity

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1. Introduction

The COVID-19 pandemic severely affected labour markets across the world. Among those, the youth employment rate was particularly pronounced (International Labour Organization 2021). There was hope that position availability for youth would rebound after the pandemic. In reality, however, major tech companies such as Amazon and Facebook quickly adjusted to the changes brought about by the COVID-19 pandemic and recorded even higher profits (Ovide 2021). It was only after the pandemic that the revenues of these industries started to plummet, resulting in waves of redundancy (Howley 2022). Under the slowing domestic economy, China's internet companies also faced the same fate. Six out of ten of the biggest tech corporations, including Alibaba and Tencent, slashed 4% to 10% of their employees (Cheng 2023). Under such a lagging economy and waves of layoffs, the existing staff such as digital labourers who have continued to work for these tech giants are working under even more unstable and precarious conditions. But, at the same time, these internet-based corporations, which are listed on the major world stock markets, have all devised various measures to make up their losses or to increase the bottom line of their financial reports. They have to come up with new and 'innovative' measures to squeeze more profit out of the saturating market in the post-pandemic era. This paper aims to meticulously examine a novel mode or mechanism of labour exploitation introduced by tech firms, specifically

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intern labour, which has emerged during a period of economic decline amid the pandemic. The objective is to elucidate how this form of capitalism, steered by technology, has evolved into a stable structure intricately connected to the state and education system in contemporary China. The study sheds light on the intricate process through which tech firms system, have transformed internships into a system that enables these digital companies firms to reduce costs, concurrently expand their workforce, and consequently, enhance their revenues. In such roles, interns are often expected to put in extensive hours, equivalent to those of full-time staff, yet they receive disproportionately low remuneration, all under the guise of temporary internships and the myth of a better material future. Our study of the internship system in Beijing challenges this conventional perception, and we argue that in cities like Beijing, where the economy is heavily reliant on digital capitalism, the internship system allows tech companies to exploit interns legitimately. Despite the precarious nature of internships for the younger generation, they often choose to accept these conditions rather than mounting radical reactions against the system.

The article starts with an explanation of what intern labour means nowadays and explains how the system is squarely articulated into technocapitalism. After a brief session on method, we attempt to explicate technocapitalism has produced a sub-precarity of intern labour who are willing to accept the condition of work under a phenomenon or process called involution. In the sessions followed, we discuss how involution works under the specific mode of capitalism in China. In the end, we attempt to deconstruct the myth of technocapitalism and explain how it works in tandem with state capitalism in China.

2. Internship and Intern Labour

Elucidated in this study is that university or college students are subservient to the essentially compulsory schema of internship jointly constructed by (socialist) capitalism and the state in China. In this post-industrial period in which there are more graduates produced than are needed in the workforce, the graduating college students in urban cities face stiff competition. In 2023, with 11 million graduates and a worsening economy with massive layoffs (more than 900,000 positions cut among the listed companies) (Luojiashan de Youzi 2022), to get a job in urban cities like Beijing, college students must have performed well in school (demonstrated by their college results) or experience that they acquired by working as interns. College or university graduates who excel in their internship or multiple internships could eventually land a job with an internet-based firm for a perceived high-paying and relatively more stable job. Those who fail to get into an internship in a prestigious tech firm are easily stigmatised as inferior or less competitive candidates. Suffice it to say that a wide variety of industries, including non-tech companies (e.g., museums, banks, and even coffee shops), offer internship positions, but these are not perceived as highly paid positions compared to those in tech companies.

Currently, for students, getting an internship position during the transitional period between school and work is regarded as a legitimate career development. These interns are absorbed into this relatively new capitalist invention of this schema called internship, which is welcomed by corporations because they do not have to pay high labour costs in exchange for productive workers if they employ interns. At the same time, without any critical debate on the function of universities, the schema of internship functions in conjunction with the education system to supply trained workers to industries, while students can claim that they have fulfilled the practicum curriculum requirements of the university. In a study of the discourse surrounding student internship,

Discenna (2016) argued that the discourses of unpaid internship construct a specific labour force of the youngest workers who are made to believe that they are more employable after the internship. He also critically pointed out that the current situation in which universities heavily promote internships as part of career management worsens the income inequality of society. From the point of view of education, the transitionary stage of internship where students develop their professional identity through the experience of this semi-professional position can be regarded as a 'liminal space, according to Odio and McLeod (2021). Under this liminality, despite the exploitation of the intern job as such, as Odio and McLeod pointed out, an internship is often considered in society as a useful way for would-be employees to experience ruthless social and economic reality. The authors also noted that during this period, students will experience powerlessness, ambiguity, exploitation, and even sexual harassment and abuse before they enter the commercial world upon graduation. In other words, through an internship, the precarious condition of labour in society has extended its effect into the unregulated liminal space of the students who are only supposed to be exposed to exploitation one or two years later. This is a strategy for capitalist corporations to continue to expand their annual growth, and when the profit margin of the market has reached its saturation point, this short stage enables them to gain surplus value. In China, Xia's study (2019) of the working conditions of interns at two Chinese internet companies confirmed that interns suffer both poor working and living conditions, and this can also be attributed to the precarity created by the coercion of both the Chinese higher education system and the internet companies. This study implies that a critical study on intern labour needs to be made to examine how the schema of internship works under digital capitalism. It is also vital to explicate why the schema of internship and internship labour evolved in the first place and how the forms and schema of internship have been incorporated into the educational system and the state. The significance of this study then lies in critically examining internship as an increasingly normalised form of labour and explicating how and why young students, capitalists, and state institutions have co-produced this sub-precarious form of labour.

3. Labour and Technocapitalism

The specific focus of this study is intern labour in high-tech, primarily internet-based companies in China, a group that has often been understudied. These individuals referred to as 'interns,' occupy non-official and semi-staff positions within these high-tech firms. Interns are typically students who have not yet completed or have just finished their studies. They either choose or are assigned to work in these companies on an internship basis as part of their undergraduate or postgraduate studies at college or university. Interns do not fall into the category of regular staff, as they are not included in the official headcounts of the companies. However, they also differ from self-employed entrepreneurs who enjoy flexible schedules and lifestyles. Interns adhere to a regular workday and are subject to the companies' regulations and policies. Working today as interns in tech firms, however, involves a different social feeling. Like those working in Silicon Valley, someone who works in the high-tech sectors, or 'big factory' as the Chinese would call it, would be crowned with an 'aura'. They are often associated with individuals who have excelled in higher education at prestigious universities. However, in the socialist market economy of China, these tech giants operate quite differently from state-owned corporations, particularly in terms of remuneration and benefits. Notably, corporations such as Tencent, Alibaba, and Baidu, which are frequently listed in New York, Hong Kong, and China, offer their senior management exceedingly high salaries along with share bonuses or stock options. Even lower or

middle-level staff, to a certain extent, receive substantial compensation compared to their counterparts in non-skilled or professional roles in other corporations, state institutions, or agencies. Of course, adhering to capitalist principles, the possibility of redundancy or layoffs exists, occurring at any time when staff fail to meet the expected performance standards set by the corporations.

Historical and social context is different as it might be in the case of China where internet-based high-tech firms are perceived as a new mode of production for driving the economy in the new era of technocapitalism. Technocapitalism is often criticised as an economy in which digital companies produce content, products or services obtained by commodifying labourers and the work of creativity (Suarez-Villa 2009). In this paper, without going in-depth into technocapitalism, we attempt to focus more on how the new generation of university graduates or new labourers survives in this context.

The force of attraction toward such high-tech in these corporations could come from the socially constructed narrative about the emancipatory potential of new communication technologies – from lessening control to increasing participation – which in turn leads to a new industrial revolution and its possibilities (Garnham 2000). In China, the prevalent narrative among young professionals revolves around “financial freedom”. There is a widespread belief, especially among those in high-tech firms, particularly start-ups, that by attaining high positions or acquiring stock options, professionals can eventually reap substantial monetary rewards, enabling them to retire or pursue other ventures. While this notion may not be entirely untrue, it is less common now, differing from the time when Tencent and other tech firms first pursued IPOs several years ago. Additionally, despite signs of a decline in technocapitalism due to economic downturns, ironically, social media—integral to this sector—continues to actively discuss and perpetuate the narrative of financial freedom.

Undoubtedly, the ethos of experimentalism ingrained in high-tech capitalism can be exploitative and chaotic (Suarez-Villa 2009). However, there is also a creative aspect to it (Thore 1995). In any case, labourers engaged in high-tech roles within internet-based companies are perceived as playing crucial roles in ‘cool’ jobs and ‘hot’ industries (Neff, Wissinger and Zukin 2006). This new mode of production brings forth two common promises. Firstly, there is the self-employed or entrepreneurial labourer who assumes the role of an influencer or microcelebrity, enjoying a flexible lifestyle and, at times, crafting new subjectivities through entrepreneurial self-making, despite the absence of job security (Zhang 2023). Secondly, there are educated knowledge labourers, akin to those in Silicon Valley, described by Hyde (2016) as a high-velocity market. These individuals may relish high salaries or potential compensation (especially stock options) and are willing to embrace short tenures, rapid turnover, and extended working hours.

4. Method

The data of this study are based on the ethnographic work of one of the authors, Feier Chen. Chen was a master’s student majoring in digital content in the School of Arts and Communication at Beijing Normal University (BNU), where the other authors serve as professors. The research began as an internship-cum-ethnographic study for Chen. Before and during the study, Chen was instructed and trained as a researcher while a student at BNU.

Chen’s internship took place in one of the biggest game companies in Beijing. The prerequisite for serving as an intern at the company was computer animation and illustration literacy. Chen was aware that while the University provides courses on concepts and development of the industry, together with basic skills in animation, there is a

significant gap between the industry and the academic training in terms of techniques and know-how. Interested in joining the game industry, Chen spent RMB8,000 to regularly attend a short, intense cram class three times/week (3 hours/class) for six months from August 2018 to February 2019 to learn digital graphics and computer drawing. She then entered an open competition for computer illustration organised by a tech company in Beijing. The winner and a few runners-up were awarded internship positions at this giant tech company. She won the competition, which included 1,000 contestants, and she was given a position as an intern game artist for three months. At that time, it was her third year of study at the University. As she had to complete a master's degree in her fourth year, with her supervisor, she then planned this study on internship labour. In May-August 2019, Chen formally joined a game company (hereafter called X) as an intern artist in a position involved in a project on an MMORPG with ancient China as the backdrop. She told her supervisor that she was also interested in working as a researcher, and she received verbal consent to do ethnographic research. In the process, she documented what she did and experienced as an intern while receiving guidance from her supervisor at the University. In a nutshell, the ethnographic account of this study is about how high-tech capitalism worked through this internship position to ensure that she 'professionally' delivered digital artwork in gaming.

As for the actual work, Chen was assigned to a mentor who was one of 10 artists in a large production team with hundreds of staff. She worked from 9 am to 7 pm each day with a two-hour lunch break for three months with occasional overtime work together with her supervisor. As with other interns, the three-month period was the norm for the internship, and with this minimum period, any interns can ask companies to provide proof of their internship which they can include on their CV. In the same period, she documented her daily routine and self-narrative. The other two authors also interviewed her to conceptualise and contextualise the data. In 2010, to supplement the ethnographic data, we interviewed 10 artists from the same industry, from interns to experienced video concept artists who had worked in the industry for 13 years. Based on these interviews, Chen wrote a master's thesis and paper about video game concept artists in a big tech company as one of her graduation requirements.[1] In 2023, after the pandemic, to explore the phenomenon with cases of internship in other arenas (e.g. for music, social media apps etc.), we interviewed three more interns. Such supplementary data also covered the internship experience of those working in three other major internet-based companies in Beijing. These interns worked in the content production, marketing and copyright departments of these tech companies.

5. Sub-Precarious Conditions of Work

Interns in Beijing receive meagre monthly wages from companies. According to a survey of 16 tech companies in Beijing, the daily income varies from RMB 200 (US$27) to RMB 600 (US$82), making it challenging for interns to make ends meet. Typically working from Monday through Friday with weekends off, interns, unfortunately, do not have access to medical benefits or sick leave. In the event of illness preventing them from working, interns receive no salary during their leave. The sole fringe benefit tends to be a meal plan for lunch. With rental costs consuming half of their income, interns

[1] Some of the data presented in this article is derived from Chen's original fieldwork conducted for her master's thesis in 2020. Additionally, a Chinese paper focusing on the study of video artists in the game industries in China was published by He and Chen in 2023. It's worth noting that, in this latter publication, intern labor was not the primary focus.

face a critical financial situation. Before the onset of COVID-19, some companies provided cash allowances for rental and meals, but many of these allowances were discontinued as the economy took a downturn after the pandemic. Additionally, it was widely understood that all staff members were expected to work extra hours. At X company, for example, Chen would not receive extra income for the additional hours worked. In our interviews with interns from various companies, we discovered that monetary compensation for overtime work was rare. Despite this, interns often received dinner provided by the companies and reimbursement for taxi fees when heading home late. The question that arises is whether the working conditions for interns in Beijing can be deemed precarious.

According to Studyportals (2023), Beijing is the most expensive city in which to live, and students need US$1,000 to US$1,200 to cover all expenses. If students were only offered minimal wages, the internship system theoretically would not have been able to be robustly sustained. In practice, universities in China subtly collaborate with these tech firms to make the internship work, ensuring that the salary provided by a company, for instance, in Beijing, is sufficient to meet the daily expenses of an intern studying in the same city. Throughout the internship period, the education system complements the experience by continuously providing interns with almost free or very low-cost accommodations in student dormitories, thereby alleviating students' rental costs. Companies, on the other hand, often have on-site staff canteens that offer free meals for interns. The government also plays a role in this process; authorities heavily subsidize commuting costs across the system, with subway tickets costing as low as or less than US$1, even for a 40 km journey in Beijing (China Highlights 2023). This significantly reduces interns' travel expenses. Ultimately, an average salary of US$ 400-600 for an intern in Beijing can cover their school tuition, accommodation (despite the low cost), and daily necessities. However, some interviewees mentioned that they had to seek financial support from their families to survive the internship. Many students who are genuinely financially disadvantaged or come from third-tier or fourth-tier cities may find it impossible to afford an intern position in cities like Beijing, Shanghai, or Hangzhou, where high-tech firms are concentrated. Thus, the internship can be seen as an evolving social system in which the state, education system, and capitalists (or the market) collectively invest minimal costs to exploit the potential of not-yet-graduated students to the limit. These overlapping systems collaborate, if not collude, to consign student interns to a 'sub-precariat', which Soppitt, Oswald and Walker (2022) have defined as groups being denied access to even precarious work. These interns in tech firms in Beijing are faced with dual exploitation: the work is short-term and temporary on the one hand, and their salary is much lower than normal staff on the other. In other words, there has been another sub-class created – which is an inferior and lower one – below the formal class of tech company employees, who have already been described as working in precarity. This sub-class may not differ significantly from the lower working class or blue-collar workers, who also endure low salaries and minimal protection. However, following Wright's logic (2016), interns can be classified as a sub-class because they harbour distinct agendas and survival strategies compared to the lower class in society. Labelled as interns under mentorship and operating under the pretext of learning in progress, individuals in this sub-class, despite facing exploitation from both the firm and regular staff, perceive or believe that they are in a temporary transitional phase. Unlike the lower class, who may have limited upward mobility opportunities, interns still have the prospect of striving to secure a permanent position as regular staff in a high-tech firm. In the case of Chen, she worked with other full-time staff in a production team consisting of around 100 people. But there were actual differences in

terms of the work. In the first three working days, Chen was assigned a real illustration job by her mentor. It was a computer illustration of the full outfit of an animated character. In essence, it was a skill assessment given to her. If she passed it, she would be fully integrated into the production team for the game production. If she failed, she would be treated as, more or less, an extra hand in the office, and she would remain on the periphery of the team, although as Chen said, she was never ill-treated. Chen thought this was an impossible task for her as the drawing would require advanced skills and years of experience for a professional to accomplish. In addition, Chen's specialisation was the Western style of illustration, but the requirement of the job was for the national Chinese style (*Guofeng*). Naturally, she failed, and for the rest of her internship, she continued the job of drawing minor props for fictional characters (e.g. pets, swords etc.) of a game every day. She noted that because of interns' low salary, for the company, this meant little cost for them. Eventually, there were some of her illustrations that could be selected for use in the actual game. After three months, she underwent a final 'internship examination,' and as anticipated, she did not pass and was subsequently compelled to resign from the company.

6. Involution and Precarity

Chen's experience was not unusual. It is a common experience for interns in these high-tech firms. Internship, being low paying and short-term, is exploitation of students, where some interns are considered just casual labour in the company. The question is why Chen, and many other interns turn to internships – some more than once – while they are aware of the potential alienation and exploitation of such intern labour. In our interviews with interns, indeed, some interns could not offer a rational answer for the precarity. Some deemed it quite natural and a matter of having no choice. Nevertheless, what we found was common in their background was that those who were admitted to the internship programme of these high-tech companies were students mainly studying at prestigious universities and in major cities such as Beijing and Shanghai. In other words, these students had already been enrolled in a relatively elite system: they were all in the top layer of the higher education system in China. They were also seeing the road ahead that would lead to working in big corporations, including internet-based companies. The young intern labourers had enjoyed the taste of social mobility through capitalist work and were already halfway up the social ladder. Given the social expectations and the expectations of their parents, they could not afford to go back to second- or third-tier cities or villages to live but wanted to dwell in big cities where these high-tech firms are located. After graduation, Chen chose to work at ByteDance, the mother company of TikTok, in Beijing and would not return to her hometown, Suzhou, to live. To society, these interns are also seen as future professionals, although at the stage of internship, they might just be semi-professional in that they have enjoyed the status or recognition without necessarily having sufficient knowledge and skills for the job. However, the intern labourers' aura continues to shine until they receive their diplomas from universities and secure jobs.

With the pressures exerted on them and the lure of the profession, youth at this juncture find they have no exit. Given their records of success, they have already stepped onto the path of success offered by capitalism. Rather than complaining about the hardships, refusing to accept the absurdity of the internship or joining any structured or non-structured social movement to revolutionise the socialist-cum-capitalist system, they succumb to the intense pressure and yield to the overwhelming demands placed on them by the education system first and then capitalism at the point of taking an internship. To be qualified to be in the system, they are willing to work extra time

and expend great effort. This is the process – and also the attitude – of what we call involution.

In society, the phenomenon of involution, particularly in a relatively closed system with an abundant supply of labour, as is the case in China, naturally permits a high input of labour and time. However, the number of jobs, the volume of production, and the profits do not proportionally increase. In other words, a more competitive environment does not result in a significant collective improvement or evolution of the capitalist economy. For students, involution manifests as a relentless attitude towards their life, studies, and work. Unfortunately, this attitude has been increasingly characterized by a lack of critical examination. They never question why they have to work hard, withstand hardship, and outperform their cohorts. It can be said that this attitude is moulded by a super-competitive society. As a process then, involution can be seen as a 'must stage' for, say, students to transition from school to work. In this stage, as with Chen, the continual demonstration of success is important lest they would be outperformed by their cohorts. Chen paid to acquire skills, spent long hours learning and looked for an intern position in the company. Even though she was given a 'package' that included a precarious period of temporary work or internship accompanied by a low salary and a marginalised status of work, she had no choice but to accept it. Thus, involution seems to be a never-ending process. As an intern, without critical thinking, she tolerated the exploitation and continued to vie for higher positions until she was able to join a tech company as a formal member of the staff. But even after she joined the crew of the big firm, the precarity remained and increased.

However, involution is not a natural process of development for youth. Given the formalised system of application and operation of internships, we could argue that these high-tech giants play an active role in promoting internships and the supposedly resulting professional positions by actively innovating themselves through developing new products and branding themselves with discursive and non-discursive strategies to persuade the gullible, involuted students and would-be professionals to pursue their dream of being a creative labourer in their companies. On one hand, this strategy aims to ensure that intern labourers experience the fame and honour associated with technocapitalism, making them less resistant to the immaterial and affective allure of the internship. On the other hand, technocapitalism perpetuates the impression among interns that internet companies are the driving force of the Chinese economy—an assertion that has been substantiated by their past success. During the economic ascent of China in previous years, tech giants provided both material rewards for current tech employees and incentives for potential hires. Ostensibly, depicting an affective quality of the internship together with the material promises of the industry is the common strategy for these corporations so that they would be continuously seen as worthy for the students to engage with. In theoretical terms then, an internship is constructed as an 'advanced' mode of temporary work in-between the immateriality or affective quality of the internship and the materiality of the technocapitalism. Thus, in the involution of the youth, the process of taming these semi-(im)material labourers exists in tandem with creating the hope of a successful career ahead. The latter would embody both the affective nature of the job and the material rewarding aspect of the profession. Thus, seeing internship as a necessary stage along the professional path allows for the justification of sub-precarity, subordination or marginalisation. This is because the materiality of the job is perceived as their next level of accomplishment waiting for them.

7. Self-Reflection and Symbolic Capitalism

In our interviews with interns, we asked the interviewees to reflect on whether it would be worth being a sub-precariat. They offered both immaterial and material rationales for their responses. First, there is the immaterial gratification of being an intern. An internship is a sublime experience for the university student and novice worker. From their point of view, there is certainly a dislike of being exploited, and there is fear of challenging tasks, but their subjugation to the high-tech capitalist machines or the semi-institutionalised internship arrangement can be associated with a delicious irony: despite exploitation and manipulation, there are fame, pleasure and honour concomitant with the reputation of these giant tech companies in the public discourse. Technocapitalism is seen as the main force that sustains the existence of long-practised capitalism as implicated by the gradual and steady rise of the US's NASDAQ Index – one measure that reflects the growth of high-tech companies. As previously noted, Tencent, Baidu and Alibaba are all New York-listed companies. For interns, entering into these global companies would be conceived as entering into a new international class status. On the one hand, among themselves and between interns and companies, the eminence and notoriety of this high-tech capitalism is internalised. On the other hand, as explained by Chen and other interns, these feelings are also reinforced by their cohort of classmates who might not have this internship opportunity.

Second, in practice, there is the potential or hope for momentary reward. An internship is seen as a transitional state leading to entry into the circle of high-tech companies. It is a step for interns to kick-start their careers in the dream job of a high-tech company which will offer a salary two to three times that of a recent graduate. Human resources departments do factor in an internship experience in these three or four big tech companies (Tencent, Alibaba, Badu and ByteDance) as a concrete benchmark of the success and talent of the graduates. Interns told us that there are cases where interns returned to their intern firms to become full-time staff later on. Chen met interns who outperformed others and did stay on working in the company as full-time staff. One graduate interviewed, indeed, 'collected' these work experiences at three big companies in a row so that her CV was even more impressive. Internship, at this point, is seen as a form of symbolic capital of honourability which could be interchangeable with other forms of capital (financial, cultural etc.) in a later career stage.

It seems that at this advanced stage of capitalism, capitalists attempt to maximise their profit to convert the surplus value of intern labour into profit, and in return, they create new kinds of symbolic capital – in this case, the intern identity – as an indirect (immaterial) and deferred material reward for those new labourers participating in an internship. This symbolic capital is a capital demonstrating honourability. This is usually a deferred reward for interns without a strong guarantee of a stable job, but as the industry is structured in a way that they all recognise such symbolic capital, it convinces the interns to believe in the value of this capital. This is an advanced way to attract workers into the creative industry as affective labourers who would likely feel the instant reward of fulfilling their emotions and desires. However, the effect of affective labour varies. Some are more attracted as the affects felt are stronger for those involved in games, animation or creation in the industry. In terms of the rise of symbolic capital, it is now more structural, universal and exploitative. The scheme of internship started in Silicon Valley as an effective means to recruit talent into companies and has evolved into a trusted process through which recent graduates can be potentially hired into companies, at least, in China.

In most cases, these symbolic capitals are not always evident, as it is more about the personal experience of students. But quite interestingly, there are specific cases

where the honour and status of interns are visible. Concerning this aspect, Chen has a self-narrative: although there no printed name card was given to her, she hangs a company lanyard around her neck. The lanyard is not just an electronic device that enables her to enjoy free meals in the staff canteen. What is more important is that when she wears it, for instance, in a lift, she will be recognised by colleagues of the company or staff of other companies as a member of the staff of Company X. At such a moment, she feels that she has attained a certain amount of fame resulting from her association with Company X.

8. Deconstructing the Material Myth

There is yet an empirical question to answer. Will that symbolic capital as well as the affective labour be translated into a material reward in future? In Chinese society, it seems that no one questions this. Under the context of involution, there is no reason for interns to be critical of the myth. They are probably the beneficiaries of the system, even though not all of them eventually excel. On the side of the capitalist, at least, the myth of a promising well-paid job is not unrealisable. For example, in the US, there are similar narratives about the condition of game developers and artists on the East Coast and West Coast. These professions are always seen as creative, enthusiastic, autonomous and passionate (Thompson, Parker and Cox 2015), and the superiority of the lifestyle associated with them is sustained by high salaries. Senior positions in game companies in the US, such as game character designer or senior concept engineer (with annual salary up to around US$135,000 on average), do enjoy a decent salary (Jobted 2023). In China, the myth is even more accepted in the game industry, which is a leading cultural industry in the country, as, for example, Tencent is one of the largest tech companies listed on the Hong Kong market. During the period covered by our research, given the exorbitant growth in the game industry from 2008 to 2021 with market revenue of RMB296.5 billion (around US$40 billion) (Statista 2023) and the mass hiring of game-related graduates and the acquisition of game productions in Tencent, there was the general impression among interns that game labour is well paid. Based on a national report that tallied the salaries of the game industry in 2019 (Strait.com 2019), the entry-level salary of video game concept artists for characters and settings was around RMB12,000 and those who had 3-5 years of experience could reach RMB 20,000-25,000, which would be considered high by Chinese standards. Nevertheless, there is no assurance that this myth holds for all interns. Considering the prevailing uncertainty and the substantial layoffs in recent times in both global and Chinese tech companies, the myth can be seen as a mutual excuse. It serves as a rationale for interns committed to serving the companies and for the companies that establish temporary working intern contracts.

Interviewees told us that if they started their job at top game companies, such as Tencent and Netease, the monthly basic salary would be over RMB20,000, and many of those we interviewed enjoyed an income of RMB 30,000-40,000. To compare, in the same year in 2020, the average monthly wage of persons employed in urban areas in China was only RMB8,1000 (National Bureau of Statistics 2020). Thus, despite lacking confidence in the job, Chen's starting as an intern concept artist could lead to a promising job with high rewards. Indeed, after concluding her internship, Chen secured a position as a concept video artist for a simulation game (SLG game) in another reputable big tech firm. At that point, she genuinely believed that she had realized the myth. As an affective labourer, Chen used this belief to justify serving as a low-paid video artist during her internship, convincing herself that the value of artistic work could not be purely evaluated by material rewards. This perspective inadvertently provided

capitalists with an opportunity for exploitation and offered Chen herself an excuse for self-exploitation. However, despite her efforts, Chen was terminated after two years when the game market was perceived to be declining. Currently, without a plan to return to these big tech firms, she has landed in a medium-sized game company as a video artist for a casual game, where the salary still does not exceed RMB10,000 per month. Chen's story illustrates that while she briefly enjoyed the taste of a well-paid job, its stability was highly contingent. Once the capitalist market fluctuates, job security becomes precarious. Chen is just one example among many interns who have experienced similar trajectories.

9. State Capitalism at Work

Chen was self-reflective in the process of research. Based on the context she and other interns described, we prompted her to give an ad hoc answer as to why the norm or culture of an internship is well-normalised and internalised in China among the new generation who are in the transitional stage of society, although many interns dismissed the myth of the material guarantee. Based on what they told us, we would argue that there is a structural legitimisation of internships. This construction of internship – as a necessary transitional and liminal stage for students – seems a collusion between the educational system of the state and the corporations in the market. On paper, though, there has been no educational policy documented about and planned for such a constructed period of internship, which is a loose, more relaxed study period for students without much academic work or learning activities.

On the one hand, the design of the entire university system facilitates internships, making it a logical move for this transitional period. In China, the study period of a normal undergraduate student in college or university is four years. The number of academic credits required for students in a Chinese university is the same as those in the Western system. While Chinese universities require, more or less, the same total number of credits (and study hours) for graduation, the two fall and winter semesters in a Chinese university are longer than those of North American universities; each lasts for 18 weeks while in a normal American system, each lasts for 14 weeks. Unique to China, for the undergraduate programme, most of the core courses are compressed into the first three years and can even be packed into two and a half years of study. Then, for the last year, students are required to enrol in only a few courses. In other words, combined with the summer of the third year, students could have a very long period for internships. For a master's programme, a similar arrangement is made. In China, a master's programme lasts for three years. While there is one year of coursework and a thesis requirement toward the end of the study, there is a long period of 'free time' sandwiched between the second and the early part of the third year of study. Masters' students are encouraged to take up an internship in this designated free period. This is not just the arrangement of universities in Beijing. All universities in China operate the same. In other words, the education system constructs a long gap in-between schooling and working, which naturally makes an internship possible and a legitimate choice for students.

One of the interns who worked in the music session of one of these tech giants, Y, in early 2023 mentioned that she was supposed to take courses at the university during that period. Y is more than 30 km from the company workspace, and she was so occupied with the 'job' that she was not able to attend classes at all. Yet, she told us that most of the professors understood the situation and implicitly allowed her absence. The interpretation is that the education system is flexible enough to allow internships to blend with learning, despite the time conflicts. The blending between internship and

schooling however is not facilitated by the teachers. Seldom do teachers assign students to a corporation for internship. College students have already internalised the need for internships, and they would pursue the opportunity on their own. Nevertheless, after a three-month internship is completed, students are awarded a letter of certification with which they can claim the internship credit that is recognised by the university curriculum.

On the other hand, capitalist giants set up a recruitment framework to legitimise the recruitment of interns. The human resource departments generally post their internship ads on a Beijing-based app called Intern (*Shixiseng*), where potential candidates can apply and upload their resumes. The app also serves as a matchmaker for employers and interns. Selected candidates have to go through at least two rounds of interviews to secure an intern position. The whole process – or the ritual of job application – has been structured and formalised so that internship is framed as a necessary and professional stage for a professional. Successful candidates are offered a formal contract as well as a confidentiality agreement, and one of the clauses in the contract specifies that candidates are not allowed to disclose the amount of their salary. However, without being able to determine the exact amounts, we realised that the salaries of interns vary among companies. In some cases, the salary was felt to be acceptable by the interns, and they would also be compensated for their overtime work. But, for some, the salary was minimal, and it could just cover the transportation and living costs. Also, the university system is involved. Because the period of internship overlaps with the four years of the formal curriculum of college or university, interns or students are still compelled to live in the dormitory of their mother college or university (Aienji 2010). While there are students who complain about this, they are also blessed to enjoy the low housing cost that ranges from RMB 1,000-1,500 (US$ 135-200) per annum (The Paper 2021).

At this point, it is worth mentioning that the cooperation between the education system on behalf of the state and the private capitalists is not on par with the common form of state capitalism that we usually define. The latter, which is seen as a new politico-economic order in Eurasia, often refers to a social or economic system in which the state partakes in and even monopolises economic activities for profit and runs its national enterprises to extract surplus value from production for the state (Spechler, Ahrens and Hoen 2017). However, in our case, we found that the state conspires with capitalism in a different way and for a different purpose. While capitalists take the surplus value out of the labour of the interns, the state mitigates the anxiety of the mostly one-child family students, who often have not been exposed to hardship, to secure what is perhaps the first ‘job’, though low-paid, in their life. As for the strategy, the socialist state does not do all the planning and monitoring, and the educational system reserves the time and curriculum for capitalism to become involved. Capitalists consensually then play a significant role in scaffolding their internship framework. In this sense, capitalism and the education system in China form a symbiotic relationship to shape a more or less universal schema of internship into one that fits well into the college curriculum in China. In the process, the resources provided by the state make it possible for high-tech corporations to begin to extract the surplus value of their staff’s labour before these labourers can legitimately work in society. The consequence of such a formation of ‘state capitalism’ is that the capitalists are invited to participate in a more relevant and longer-term discourse concerning China that aims to tackle the rising discontent of the society by shaping a more stable or ‘harmonious society’ (CMP Staff 2021). Yet, this is different from the previous propaganda and government campaigns, as state capitalism deviates from the hardline authoritarian measures and this can be considered a more ‘advanced’ solution offered by the state. Instead of

suppressing the dissident voices on social media and other public outlets, the state introduces and normalises new preventive measures – in the education system and the workplace – to prevent any potential public outcry. It also presents a positive image of the state and communicates the message that the authorities care and acknowledge the issue of youth employment, and that is why the university curriculum has been adapted to accommodate the needs of university graduates.

10. Conclusion

The paper has discussed the formation of a sub-precarity class – the interns – within internet-based tech corporations. In our study in Beijing, we found that a schema of internship has been set up as a liminal or transitional stage for students between study and work. From the point of view of university or college students, in a highly competitive environment in which their future career and job opportunities are uncertain, they feel obliged to apply and compete for an intern position. In Chinese society, an internship is, in general, regarded as prestigious and another demonstration of a student's ability, other than academic results and rankings of the graduating college. While internship as a stage of in-between learning and working has been normalised in society, the internship system has been further legitimised by corporations which have set up formal procedures for application and operation as well as by the education system that carves out an academic calendar to accommodate the internship. It is an overt case in which capitalists have joined hands with bureaus of the state to create this schema of internship. For capitalists, they offer a temporary position to society in exchange for a higher level of production at moderate additional expense, hence enabling them to further boost their profit. For the state, it manufactures an education system that provides room for internship and, in return, decreases the youth unemployment rate and presents the image of a more stable society by giving confidence to students that they are fully prepared for jobs in future after internship.

Despite the awareness of the precarity of internship, intern labourers seem content with the current situation, tolerate the low wages and temporary arrangement and strive to secure an internship position and even multiple and consecutive positions. They fall into a position in which they are much better off than others but still not able to achieve a reasonable living standard. They are at a point of no return when they discover for themselves that they are now in the higher education system and on the road to joining the capitalists. This is a process that we call involution in which the new generation is induced to accept a period of precarious economy with a nominally paid first job where they struggle to survive and meet their daily needs while dwelling in big cities, rather than engaging in a radical change or revolution. We would argue that tech companies are currently able to construct an 'advanced' mode of work (or internship) in between the immateriality or affective quality of the internship (or their potential real positions) and the materiality of it. In the involution, the process of taking full advantage of these semi-(im)material labourers is at work. The promise of an affective and materially rewarding career is a prepayment to those 'successful' interns who have already reached this level of their studies or careers. Intern labourers receive such an 'advanced' payment, which is a mix of wealth, hope and fame that justifies their current status where they have a limited degree of freedom and earn a relatively low salary. It is such in-between-ness that perpetuates the involution of the new generation while technocapitalism can sustain itself. This explains why tech companies can still exploit intern labourers without their complaint and why they react placidly – and even contentedly – to the exploitation of their work, space and time under this globalising phenomenon.

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Tracing Class and Capitalism in Critical AI Research

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Abstract: This article explores the rapidly developing field of Critical AI Studies and its relation to issues of class and capitalism through a hybrid approach based on distant reading of a newly collected corpus of 300 full-text scientific articles, the creation of which is itself a first attempt at properly delineating the field. We find that words related to issues of class are predominantly but not exclusively confined to a set of studies that make up their own distinct subfield of Critical AI Studies, in contrast to, e.g., issues of race and gender, which are more broadly present in the corpus.

Keywords: artificial intelligence, machine learning, digital capitalism, research, critical studies

1. Introduction

Artificial intelligence (AI), referring to machine learning, large language models, image generators, and assorted emerging and long-existing computational and algorithmic systems, is a term currently used by self-proclaimed futurologists and marketers alike, who have great success in building unjustified hype around these digital products and services. AI, as currently constituted, is inherently tied to digital capitalism, with both its technology and the data it runs on functioning primarily as commodities to be bought and sold. As the research area of Critical AI Studies is rapidly developing, and as notions of what it means to be 'critical' may vary, this article investigates to what degree the topics of class and capitalism do indeed come to the fore in this developing field.

Even if we define AI more conservatively, many ties to digital capitalism remain, notably between AI and automation and the mechanisation of the workforce. There are, for example, many attempts to directly replace or supplant labour with AI in a growing number of jobs, but AI technologies are also used for increased regimentation of the workforce through algorithmic management and AI tools that 'optimise' labour, e.g., in Amazon warehouses and the so-called gig economy (Jones 2021, Delfanti 2021, Ongweso Jr. 2021).

By inferring future performance and categorisations from past data, AI also strengthens existing societal power relations, reifying them and embedding them in naturalised form in technical infrastructures where they may be even harder to counter than in their social form. AI solutions may exacerbate and further polarise existing social divisions by relying on training and benchmarking on discretised data, demanding and proliferating sharp and 'objective' distinctions between different categories (Birhane et al. 2021).

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Perhaps more tangibly, the consolidation of AI-related research and development among a small number of primarily US-based tech companies provides clear evidence that AI forms a next frontier to further centralise power and wealth accumulation through computational infrastructures, often reifying existing racist and white supremacist ideas and practises to breed new forms of global digital colonialism and capitalism(Whittaker 2021, Kak and Myers West 2023, Birhane et al. 2021, Couldry and Mejias 2020).

With this tight entanglement between capitalism, conservatism, and the current iteration of AI, it is perhaps no surprise that several strands of distinctly progressive AI-critical research are being pursued. In particular, AI has garnered a large amount of regulatory scrutiny, with many countries pursuing legislation to curb the excessive use of AI and to try to limit the harms and risks that may come from its deployment. Additionally, attempts to de-bias, correct, and otherwise counter AI's inherently conservative and structure-reaffirming tendencies are legion at conferences such as AIES and FAccT, as well as the major AI conferences such as AAAI and NeurIPS.

1.1. Research Aim

In light of this far-reaching and complex entanglement of AI and capitalism, we aim in this article to investigate to what degree and how issues of capitalism and class are articulated and positioned in the field of critical AI research. We do this through a systematic analysis of academic publications in this area. Approaches from natural language processing will be leveraged, alongside descriptive statistics, to provide distant readings (Moretti 2013), to map general structures and patterns in how these issues are dealt with in current critical AI research. We will apply these methods to a dataset of research articles sampled from the Scopus database to investigate the role of perspectives on capitalism and class.

Our assessment will draw on established criteria for what constitutes *critical* analysis – “critical ethics; critique of domination and exploitation; dialectical reason; ideology critique; critique of the political economy; struggles and political practice” (Fuchs 2022, 20). The goal is to provide an empirically grounded classification of how capitalism and class are acknowledged or ignored in the research.

Being a kind of meta-study, this article is partly influenced by the paper “The Values Encoded in Machine Learning Research” (Birhane et al. 2021), wherein the authors examined biases in machine learning research through an analysis of 100 much-cited papers from leading machine learning conferences. A key finding was that only a small minority of the papers (15 percent) linked their work to societal needs, and that only one percent discussed potential negative effects. The authors found values such as performance, generalisation, quantification, and efficiency were at the centre, leading to a centralisation of power. Furthermore, they found notable affiliations between the papers, major tech companies, and elite universities. In this paper, we devise a similar critique but with a somewhat different approach. Our study is not focused on mainstream and high-profile AI-research papers but on papers sampled and extracted based on their affiliation with a ‘critical’ perspective (see further the section on “Dataset Creation”). In other words, our study aims to contribute to a more comprehensive and diverse analysis of biases in AI research by focusing on perspectives explicitly positioning themselves as critique. Furthermore, our study leverages the combination of computation and interpretation offered by a distant reading approach.

2. Method

2.1. Dataset Creation

As stated above, this study's goal is to analyse to what degree and how issues related to capitalism and class become articulated and positioned within critical AI research. Initially then, there is a need for a conception of what critical AI research entails. It is only based on such a definition that we might be able to construct a reasonably representative set of publications to analyse. To achieve an operationalisation, we designed a search string for use with the Scopus indexing service through iterative experimentation. While Scopus is not exhaustive, it covers a significant segment of academic literature, which is why we chose it to construct our dataset. In the field of bibliometric research, Scopus is one of the premier databases, as it has broad coverage across a wide variety of disciplines (Falagas et al. 2008, Mongeon and Paul-Hus 2016), is frequently updated (Mingers and Lipitakis 2010), and has robust export features (Meho and Yang 2007).

As the field that we are trying to delineate is well underway to becoming known under the moniker of "critical AI studies" (Roberge and Castelle 2021, Lindgren 2023b, Jones 2023), we included that as one of the key terms in our query. But importantly, to capture articles that conceptually match with the field but do not necessarily use that specific term, we searched for a set of terms (for example 'critical theory', 'marx*', 'racis*', 'capitalis*') in conjunction with AI terms. The query used was the following:

> TITLE-ABS-KEY ((("social justice" OR "queer" OR "critical theory" OR "marx*" OR "feminis*" OR "decolonial" OR "*racis*" OR "*fascis*" OR "*capitalis*") AND ("artificial intelligen*" OR "data scien*" OR "machine learning")) OR "critical AI studies")

Briefly, then, we queried for articles that, in either title, abstract, or keyword, contain either the name of the research field itself ("critical AI studies") or a combination of two sets of key concepts: first, something pertaining to the "critical" part, i.e. some subject of critical study such as various structural biases and systems of oppression, or a critical approach, such as feminism, decoloniality, or similar; and then something pertaining to "AI": AI, machine learning or data science. Deploying this search query yielded 1212 articles in the Scopus index on June 22nd, 2023.

It should be noted that our sampling strategy inherently involves a certain element of potential circularity. This is because the terms used to delineate and extract articles in Critical AI Studies inevitably shape the results yielded. However, this is also a deliberate choice aligned with our research aims. Our study does not seek to determine *if* specific themes, such as class, capitalism, social justice, feminism, and decolonialism, occur within the literature on AI. Rather, it aims to analyse 'to what degree' and 'how' the particular topics of class and capitalism are discussed and positioned in relation to others. This involves examining their proportionality and positioning within the broader area of Critical AI Studies. It is essential to include these terms in our search strategy to capture a relatively broad spectrum of critical scholarshipon AI. This approach has allowed us to collect a dataset that hopefully reflects a certain degree of variety and depth of critical perspectives in the field. So, for the purposes of the search string, terms like 'class', 'capitalism', 'social justice', 'feminism', and 'decolonialism' are not just keywords but foundational concepts that we see and assume as having shaped the discourse of Critical AI Studies. Moreover, it should be noted that while the search string looks only in the title, abstract, and keywords of the articles, the study of the use

of these terms in the following uses the fulltext of the article to interrogate the use of these terms more deeply.

A manual inspection of this initial set of articles revealed, in fact, that it was overly broad and inclusive, containing many articles which would not normally be considered part of the field of Critical AI Studies. Thus, we carried out a second manual filtering step, wherein we applied a set of relatively simple and clear criteria to the articles' available metadata (title, abstract, and keywords). In particular, our interest is in articles that deal critically with the *practice* of AI, both inside and outside of academia. To minimise recency or authorship bias on the part of the author who did most of this filtering (Ericson), the order of articles was randomised before filtering. The criteria used were the following:

Criteria for inclusion:

- Articles with "critical AI studies" included in either the author or the index keywords were assumed to be in the field.
- Articles where the title or abstract strongly indicated a critical engagement with the practice of AI were included.
- Articles that strongly referenced theories and writers within the critical tradition, such as Marx, Foucault, or Deleuze and Guattari, were included.
- Articles where the title or abstract strongly indicated that they related to the impact of AI on society were included.

Criteria for exclusion:

- Articles where the title or abstract indicated that the references to "AI" were largely tangential, or as one of a set of buzzwords, or where one of the search terms had proved to hit an unintended synonym[1] were excluded.
- Articles where the title or abstract strongly indicated that the "AI" was a *tool* used in the published research rather than an object of study were excluded.
- Articles where the title or abstract strongly indicated that the study of AI in question was purely technical, implicitly or explicitly excluding any social or socio-technical aspects, were excluded.
- Proceedings abstracts and similar summaries and overview texts were excluded, as the mentioned articles themselves were assumed to be included or excluded in the filtering as appropriate.
- Full books were excluded, as they were more likely to be unavailable in full-text and to reduce the risk of including a particular chapter by itself and as part of an edited volume.

After this filtering step, our 1212 items were segmented into two groups, namely, 380 articles included for further study, and 832 articles excluded. In addition, the groups were further segmented by which criterion warranted their inclusion/exclusion and whether it applied to the keywords, title, or abstract. Due to some articles being inaccessible in fulltext format to the authors for various reasons (paywalls, no digital version, etc.), in the end 309 articles in their fulltext versions were downloaded. Out of these, nine articles turned out to be written primarily in languages other than English.

[1] E.g., "*capitalis*" matched to "capitalise" instead of "capitalism" or "anticapitalist"

Thus, in the end, 300 items were included as part of the final analysis, comprising a total of around 2.6 million words[2].

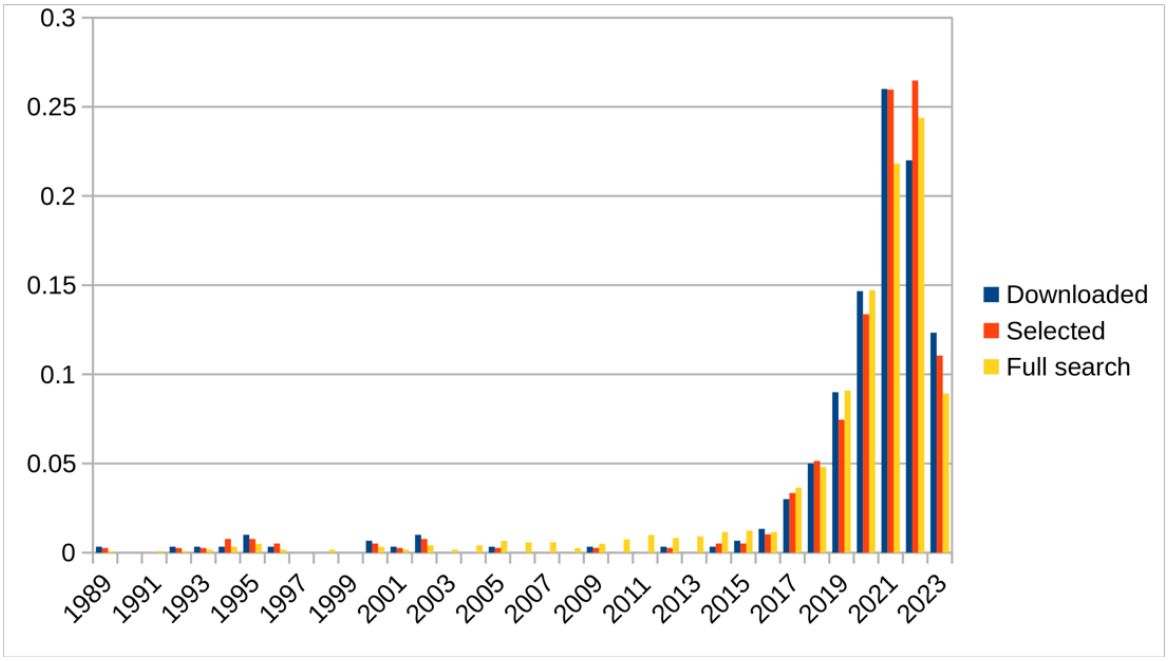

Figure 1: The proportion of items in the set published in each year (1989-2023), for each stage of the filtering: the full search results, the subset selected for further study, and those items available for download in fulltext.

To reveal any particular biases or patterns in the dataset, and in particular, how these patterns changed through the selection stages, we graphed the year of publication (figure 1), as well as the type of publication (figure 2), for the three selections: the full 1212 items of the Scopus search, the 389 articles chosen, and the 309 ultimately downloaded. For all three groups, there is an overwhelming amount of recent items (published in the last five years) in comparison to previous years, which is consistent both with the recent increase in scientific publications (in particular as indexed by Scopus) but more significantly with a recent massive influx in hype and interest in AI in general, and in particular in critical studies of AI. For document types, naturally there were a number of document types that were excluded through our application of the criteria as listed above. When we prepared the full text of these articles for further analysis, some additional exclusions were made. First, we omitted all publications in the “letters”-genre (i.e., shorter, more focused pieces, often with an expedited review process). Second, no items that were mere errata or retractions were included. Among the remaining types, the proportions stayed roughly equivalent through the selection process.

[2] The full list of considered articles is available from the corresponding author by request, but is excluded from this publication due to length constraints

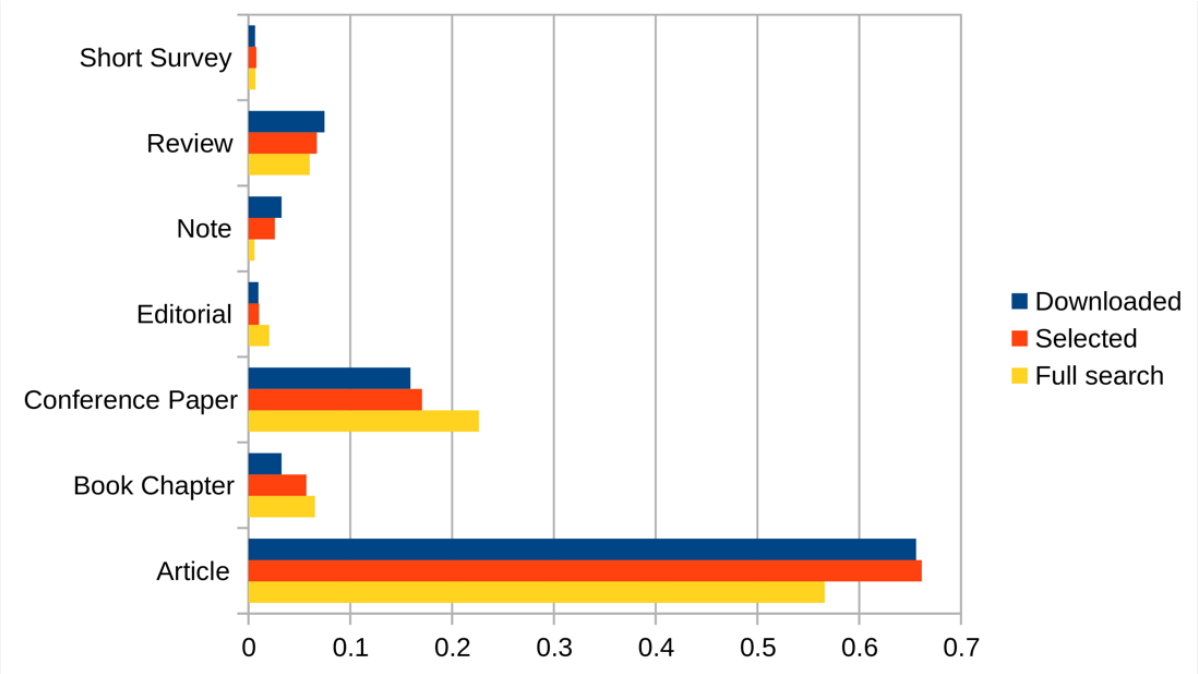

Figure 2: The proportion of items in the set of each type for each stage of the filtering: the full search results, the subset selected for further study, and those items actually available for download in full-text. Item types that only occurred in the full search results have been omitted (circa 5% of all items).

2.2. Analysis Methods

In analysing the corpus of articles, we largely employed a *distant reading* approach to get a broad understanding of the overall themes and patterns present in the texts to form the basis for our assessment of the handling of issues of capitalism and class in critical AI research.

Distant reading, as such, was coined by language scholar Franco Moretti and refers to the practice of analysing large bodies of textual data from a distance without delving into any close or detailed reading of individual texts. Moretti (2005) argues that this is to gain a macroscopic view of the corpus that can help identify overarching patterns, trends, and connections in the texts that may not be identified through close reading alone. While quantitative content analysis of text is a broadly used method in various fields, conceiving the analysis in terms of distant reading adds an additional layer of qualitative interpretation and understanding to the process. As argued by Lindgren (2020), the notion of distant reading allows for a conceptual understanding that sits better with hybrid methods than with purely statistical ones.

In our distant reading, we use a variety of techniques, described in the following sections. Briefly, we begin by constructing document vectors for each article in our dataset using doc2vec, after which we cluster the documents of the dataset to identify tendencies therein and select a subsample of specific interest. We use word2vec on this subsample to characterise the specific word associations present more clearly. Furthermore, we conduct a qualitative study on titles in the subsample and compare the relative use of various terms inside and outside the subsample. This is done to better understand the characteristics of the subsample and what distinguishes it from the rest of the dataset.

2.2.1. Document Vectors

As a first step of the distant reading, we used doc2vec (Le and Mikolov 2014), an unsupervised machine learning algorithm, for representing the full articles as vectors that were clustered using k-means before the model was reduced to 2D using Uniform Manifold Approximation and Projection (UMAP) (McInnes et al. 2020) and visualised as a scatterplot (figure 3). This analytical step helped us identify clusters of similar articles in the corpus, enabling us to see general topical patterns in critical AI research. As we discuss in the results section, we found two clusters (n = 95) to be of importance for our analysis.

2.2.2. Word Vectors

In a second step, we trained a word2vec model on the articles in the two clusters of interest (n=95). Word2vec – the model upon which doc2vec was built – is a method for learning word embeddings, which are vector representations of words in a high-dimensional space (Mikolov et al., 2013).

Word embeddings – conceived as a tool for distant reading – can help us understand the semantic relationships between words based on how they are contextually used within the corpus. Word embeddings, therefore, can be devised as tools for analysing discourses and ideologies. Lindgren (2020, 119-120) draws on the discourse theory of Laclau and Mouffe (1985) and explains how its key concepts can be mapped onto the logic of word embeddings:

> "Starting with the concept of *discourse*, it refers to the general fixation of meaning within a certain domain. So, approaching [the corpus] through word2vec and thereby getting knowledge about how different words cluster together as a consequence of [scholars'] language-use [..] is a means of mapping [..] relations among *elements* (i.e. words), engaging them as moments (i.e. words including their relational positions vis-à-vis other words). The structured totality of relational positions among discursive moments, as described by Laclau and Mouffe takes shape around a set of privileged signs around many other signs are organised. They name such key signs as *nodal points* [..]".

In this study, then, we trained a word2vec model on a subcorpus of articles, sampled as described above, with the intent of reading a 2D visualised view of that model as discursive space where critical scholarly perspectives on AI are articulated around certain 'nodal points' (Figure 4). Given our stated aim, to focus particularly on how issues around class and capitalism are handled and confronted (or not), we started our analysis by approaching the data based on a set of pre-decided terms (namely: *class, classes, capital, capitalism*), which functioned as entry points into the trained model through which related parts of the discourse could be uncovered and disentangled.

2.2.3. Preprocessing and Parameters

We trained the doc2vec and word2vec models using the Gensim library (Rehurek and Sojka 2011). Preprocessing included lowercasing, stop word filtering, removal of numerals and special characters, and a set of custom steps to filter out literature references from the full text. Importantly, we only retained nouns, adjectives, and verbs in the corpus based on which the models were trained. The models were trained at a vector size of 300, meaning that vectors of 300 dimensions represented each document and word in the text. More concretely, this means that each document, and later,

word, in the text, was transformed into a numerical representation consisting of 300 values. In Gensim, the default setting is 100, but setting the number higher can lead to more accurate models. When it comes to how many words before and after the key terms were considered as context, we used Gensim's default 'window size' of 5. This setting is generally considered to be sufficient for extracting syntactic meaning based on the immediate context of words while at the same time counteracting the diluting effect that a window size that is too large may lead to. Levy & Goldberg (2014, 3), in exploring the effects of different hyperparameters for word2vec, argue that "a window size of 5 is commonly used to capture broad topical content", which is also what we strive to do in our study.

2.2.4. Additional Approaches

Aside from the training and subsequent distance readings, as presented in the analysis section of this article, we drew upon some additional steps and measures to deepen and enrich our understanding of the dataset.

First, for the final subsample of 95 articles, we conducted a qualitative review of their titles and abstracts to get a more refined picture of what they were about in terms of what topics they engaged with and which analytical perspectives they favoured. Second, we also employed a direct full-text search of various terms to compare their relative prevalence within and outside the subsample to further nuance our understanding of the differences and similarities between the two sets of documents.

3. Analysis

3.1. Clusters of Articles

The first step of the distant reading, as described above, entailed analysing the patterns by which the articles in the corpus (n=300) are thematically related through the common use of concepts and language. The doc2vec model was clustered using k-means, where an iterative and exploratory process made us arrive at the assessment that setting k to 6 clusters provided a plot that was highly readable and exhibited a certain degree of explanatory power (figure 3). The axes in figure 3, showing a projection that reduces the multidimensional vector space to two dimensions for visualisation, do not represent any variables in the original data. As with all such projections, the axes, therefore, do not have any direct interpretation. Rather, what matters are the relative positions of points: points (articles) that are close in the high-dimensional space of the vector model are mapped to nearby points in the 2D figure to emphasise clusters.

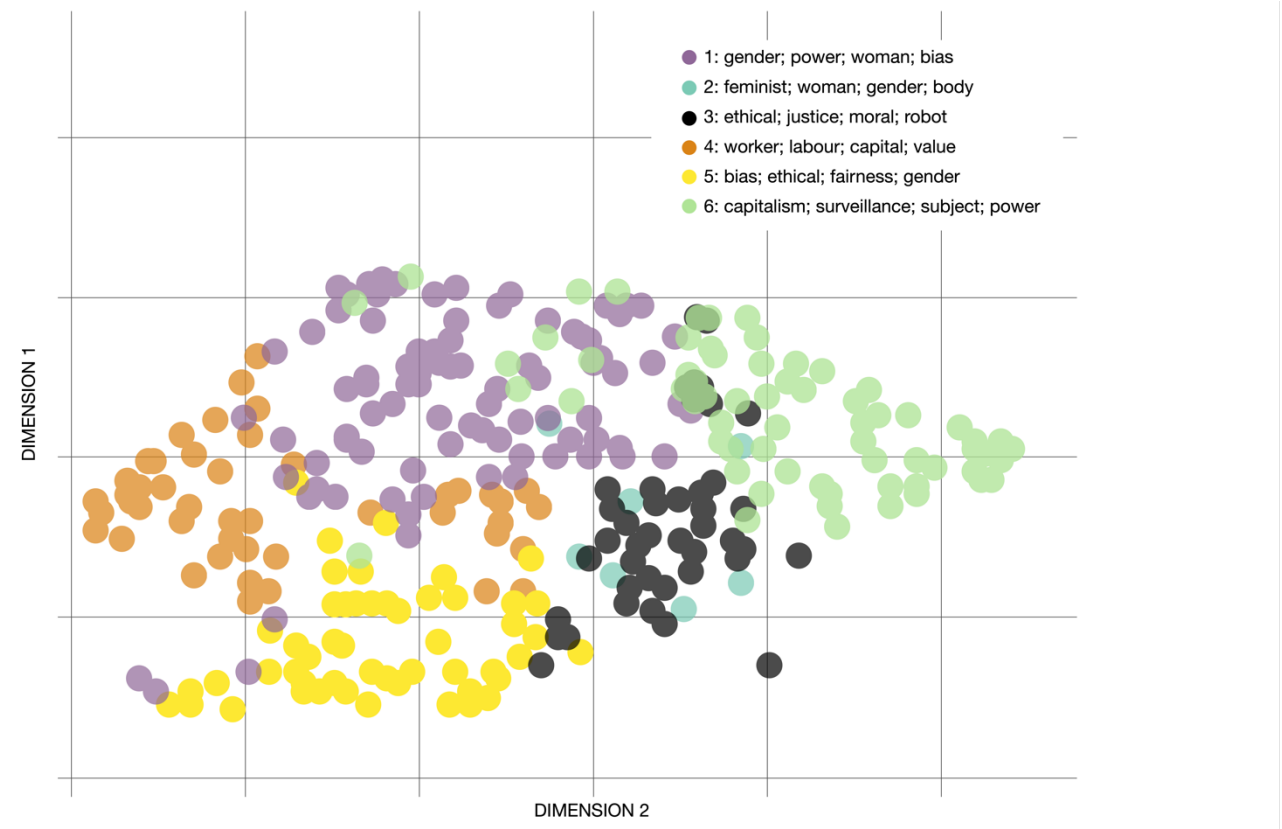

Figure 3: A UMAP 2D projection[3] of the doc2vec vectors, coloured by cluster.

We extracted top lists of commonly occurring words for each identified cluster of articles and subjected them to an interpretive reading starting from the top and moving down the list. Unsurprisingly, the top terms in all clusters included words such as 'artificial', 'intelligence', 'data', 'computers', 'machines', and so on. The objective of our readings of these lists, however, was to identify among the top words the most distinguishing words in terms of what focus the critical analysis of each given cluster of papers appeared to have. Relying on the condensed proxies of these frequency lists, keeping with the spirit of distant reading, rather than scouring the full texts as such at this point, some general patterns arose fairly quickly. In the legend of Figure 3, the four top distinguishing words, identified in this qualitative manner, for each cluster are listed.

It must be emphasised here that while there are differences between the clusters, there are also, naturally, many overlaps and a certain number of articles that could easily fit into two or more clusters. Indeed, there are many different clusterings possible, and while redoing the clustering step seems to indicate a certain amount of stability to the clusters presented here, the specifics can and do shift, particularly for those items that lie near the borders between cluster centroids.

Both clusters 1 and 2 appear to include articles with the common trait of dealing with the critical analysis of issues around gender and power. If one is to discern any differences between the two, it seems that cluster 1 is representative of a predominant focus on questions of AI bias, while cluster 2 may, to a larger degree, be marked by more common mentions of feminist perspectives and on issues of embodiment in re-

[3] The parameters were n_neighbors=8, spread=0.7, min_dist=0.2, metric='euclidean'

lation to AI. In cluster 1, there appears to be a prominent occurrence of words associated with the perspective of "data feminism" (Nasrin 2023, 141) and that engage with AI through the lens of "gender theories [that] have developed a nuanced set of tools through which to analyse issues around inclusion, exclusion and justice" (Jones 2018, 96). Articles in cluster 2 – the common words suggest – are, to a larger extent, positioned within the field of feminist AI research (Keith 1994) and seem to deal with posthuman perspectives on gender and embodiment as related to AI. Such scholarship takes an interest in "the feminist potentials [of dismissing] the separation of biology and technology [...,] merging the flesh and the machine through embodied narratives" (Ferrando 2014, 3). It appears, in fact, that cluster 5 is more about what could be labelled as mainstream AI ethics scholarship and perspectives rather than about the critical forms of AI studies that we purport to study here. The reason for this cluster still resulting from our dataset is that it, indeed, includes references to issues of gender and feminism, which matches our search terms for constructing the sample. As a side note, then, we see that when AI ethics scholarship bridges into the critical domain, it appears to do so most often by referring to gender equality and less so by referencing, for example, decolonialism and racism.

Clusters 3 and 5, while being considered through our sampling strategy as belonging to the area of critical AI research, are both, at the same time, overlapping with more techno-legal and policy-oriented scholarly discourses that centre around key terms such as 'bias' and 'fairness', which can have a somewhat corporate connotation from the perspective of critical theory (Lindgren 2023a). Cluster 3 does this while also engaging to a certain degree with issues of robotics, with characteristic contributions that "advocate caution against developing artificial moral agents" (Herzog 2021, 1) and that discuss in what ways autonomous systems are "troublesome in the ethical domain" (Paraman and Anamalah 2023, 1). Articles in Cluster 5, to the extent that they engage with specific cases, are mostly considering AI-related injustices that relate to gender. Most of all, however, these articles deal more broadly with issues of AI bias and fairness within a legalistic framework. While we, of course, cannot assess the specific level of 'criticality' of individual articles in this cluster, the key terms at the aggregated level align with what would seem to be the 'least critical' out of the topical clusters. Such an interpretation aligns with what Bassett and Roberts (2023, 80) write:

> "Critical studies of artificial intelligence pick up where normative models of 'responsible AI' end. The latter seeks to build acceptance for AI decision making by incorporating a form of 'best practice' into AI techniques and machine learning models to ensure 'equity' of some order (racial, gender, less often sexuality or disability, hardly ever class) through the avoidance of bias and 'transparency' in their operation. Responsible AI is, then, primarily a technical solution to technosocial problems."

In line with this, we might assume that this cluster may align more with 'corporate' perspectives on such critical topics. However, looking closer at the articles, we find that many mentions of these concepts are, in fact, in the context of critiquing these very perspectives. For example, in one of the articles in the corpus, the authors write that:

> "It is commonplace for large tech companies to talk of AI ethics and notions like 'responsible AI,' and many companies have internal research and policy development around how such an ideal could be achieved [...] What ambitions like

> these entail is not always clear, and such initiatives are sometimes accused of being a kind of 'ethics washing', staving off regulation and marginalising issues that do not fit the corporate agenda (Furendal and Jebari, 2023, 36)."

Furthermore, in another one of these articles, the author contends that such corporate efforts aim "to reconcile capitalist AI production with ethics. However, AI ethics is itself now the subject of wide criticism" (Steinhoff 2023, 1). Most clearly, however, the issues of capitalism and class that we aim to map with this study are found in clusters 4 and 6, where the central topics revolve around capital, labour, power, value, subjectivity, and surveillance. As described in the section on methods, these two clusters were chosen for the second step of distant reading to get a richer picture of the discourse within these areas and what that may say about how issues around capitalism are dealt with in critical AI research. While xluster 4 is explicitly centred around notions of labour, capital, workers, and so on, the connection to capitalism and class in cluster 6 might appear less direct. The reason for including the latter in the closer analysis, however, is that the importance of the notion of surveillance (also in conjunction with'power' and subjectivity) ties in these strands of research strongly to the discourse on surveillance *capitalism* as developed in and around the writings of Zuboff (2019).

3.2. Word Embeddings

The word2vec model trained on the 95 articles in the clusters (4 and 6) representative of articles where issues of capitalism appear to be central to the analysis is visualised in figure 4. In this UMAP projection plot, clusters (using k-means) are differentiated by colour, and labels for key terms have been added beside the clusters for improved readability.

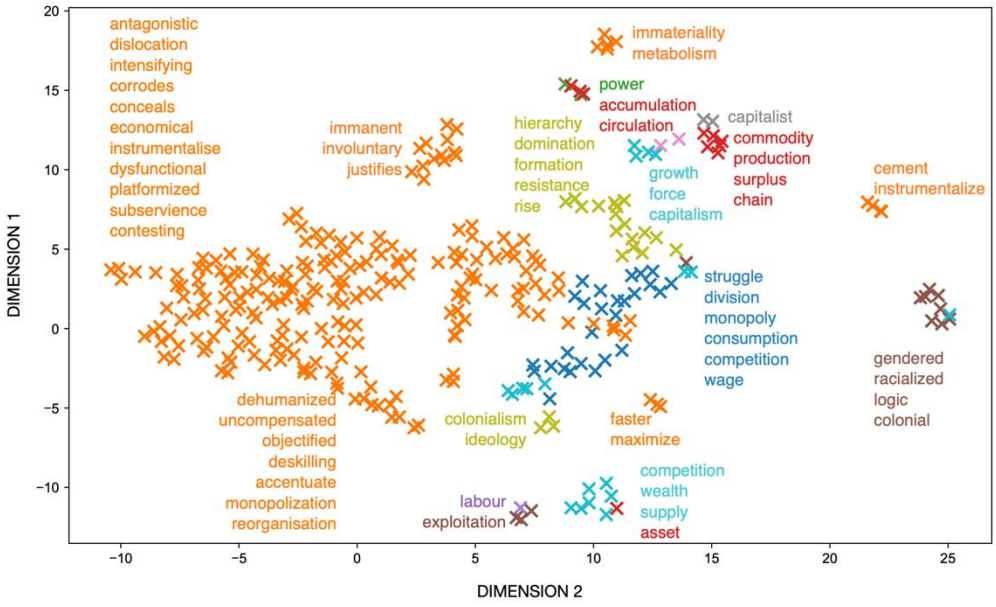

Figure 4: Clusters of words in critical AI articles (word2vec model).

Figure 4 shows the word associations that were learned by the word2vec model. The goal with this kind of analysis is to capture the semantic relationships between words based on a logic where words that appear in similar contexts have similar vector representations. To be able to visualise the vector representations in a two-dimensional figure, the high-dimensional vectors must be reduced. This is the same logic as in Figure 3, where the vectors represented sets of articles, rather than sets of words inside articles. Again, the UMAP algorithm used for this reduction, shows items – words, in this case – that are similar close to each other. As explained in relation to figure 3, the axes in these types of plots have no fixed meanings, apart from representing the two dimensions along which UMAP has chosen to show the structure of the data. As for interpreting the patterns shown in figure 4, words that are close to each other in the graph (i.e., same cluster and same colour) are semantically related. For instance, words like ”commodity”, “production”, and “surplus” are clustered together, suggesting that these concepts are closely related in the textual data the word2vec model was trained on. A visualisation such as this one creates conditions for a distant reading of the articles in question.

Making such a reading of this part of our corpus, using this plot as a heuristic tool, reveals a discursive landscape quite clearly aligning with central and Marxist concepts within critical theory. Even if the discourse can be decomposed into clusters in this way, most of them reflect standard terminology in Marxist culture and technology studies (Fuchs 2019). These include “ideology”, “labour”, ”monopoly”, ”logic”, ”commodity”, ”surplus”, and ”accumulation”, as well as notions of “resistance” and ”struggle'”, alongside many other related concepts that are symptomatic of analyses of the political economy. Notably, connections are also made to other struggles than those rooted in class (”gendered”, ”racialised”, ”colonial”) and, to some degree, to the context of digital capitalism (”platformised”). Note, importantly, that none of our sensitising concepts, as discussed in the methods section (*class, classes, capital, capitalism*), are visible in figure 4, as what is shown are all *other* terms that are among the most similar to these point of entry into the model.

The general insights gained from our distant readings, then, are, first, that notions of capitalism and class can be identified as being central in distinctive subfields (cf. digure 3) of the broader discourse of critical AI research and, second, that the discourse within those fields, while making connections to the digital, and to gender, race, and colonialism, largely reflect a distinctive and consistent terminology marked by critical concepts in Marxist analysis of the political economy.

3.3. Terms Inside and Outside of the Subsample

In table 1 below, we list a number of terms and their relative prevalence in documents taken from Clusters 4 and 6, compared to the rest of our corpus. It should come as no surprise that these relative frequencies differ between these two sets of documents, given that the clustering is taken from doc2vec, which records exactly these types of relative word frequencies. Moreover, in Section 3.1, we listed some of these terms to describe the tendencies of the clusters. In this section, we investigate these differences more fully, noting in particular that while some terms are more common within the subsample than outside of it (or vice versa), the magnitude of difference may not always be as expected. Notably, while we in some sense expect that “capital” and “capitalis*” are more commonly used within the 95-paper subsample, it is perhaps surprising that

the difference is as stark as indicated by the table (these specific terms being almost four times as common per document within the subsample compared to the rest of the dataset, while “[Mm]arx*” is three times as common, and “class” occurs almost twice as often). References to inequality are also more common within the subsample than outside, though by a smaller margin. References to both “discrimination” and “bias” are, however, significantly more common outside of the subsample than within it.

“Bias”, in particular, is almost five times as common outside the subsample as within it, which could indicate an aversion to using that term for researchers who deal more closely with issues of class and capitalism. Clearly, “bias” has come, in parts of the field of critical AI research, to connotate views of justice and fairness that are more individualistic and simplified compared to more structural analyses and explanations. Sometimes, deeper-cutting forms of systematic injustices and inequalities are obscured by a focus on surface-level statistical or computational bias. It can be argued, then, that truly critical analysis should go beyond bias to focus instead on "entrenched social values" and “even more naturalised and culturally sedimented understandings of the world and ourselves as human beings” (Bloom 2023, 35). A one-sided emphasis on “bias” may contribute to discursively constituting far-reaching problems in society, economy, and culture as issues of mere glitches to be adjusted rather than faced in more complex and multi-faceted ways.

Another pair of terms that occur much more frequently in documents outside of the subsample than within it are “fairness” and ”justice”. “Fairness” in particular occurs more than four times as often per document outside the subsample than within it. This pattern can be interpreted in terms of such notions referring to presumed universal values, which can be referenced without much further analysis or definition. This in contrast to references to “coloni” which are more than three times as common within the subsample than outside of it. Similarly, “solidari” is more than twice as common within the subsample.

Additionally, an interesting observation in terms of word choice can be made when looking for references to racial oppression. While searching for “raci*” shows no major difference between the subsample and the full dataset of papers, searching instead for ”racis*“ and ”racia*“ turns up a relative difference, where ”racis*“ (i.e., “racist” or ”racism'”) is more common outside the subsample, while ”racia*“ (”de/racial/ised”) is more common within it.

Theme	Term	Inside	Outside
Marxist/class	class	1.22	0.72
	capital	22.91	6.28
	capitalis[tm]	16.05	3.71
	[Mm]arx	5.73	1.89
	surplus	1.27	0.11
	solidari	0.5	0.19
	ideolog	2.04	1.03
Gender	gender	5.6	12.69
	queer	0.71	1.01
	misogyn	0.08	0.2
	sexis	0.6	0.76
	feminis	5.92	6.92
	patriarch	0.55	1.24
	[Dd]ata [Ff]eminism	0.15	1.13
Racism	raci	7.84	7.36
	racia	5.42	3.8
	racis	1.72	2.58
	coloni	8.25	2.52
Inequality/justice	inequality	1.89	1.2
	bias	3.14	14.26
	discriminat	2.83	4.5
	justice	3.75	8.39
	fair	2.83	9.47
	fairness	1.19	6.01

Table 1: The average amount of occurrences of various terms per document, in- and outside of the subsample. N.b. that “class” was required to be surrounded by whitespace, while the other terms were counted also as part of compound words (e.g. “bias” in ”debiasing”). Bracketed groups match either of the bracketed letters ([Mm]arx matches both “Marxist” and ”Marx”).

It is also interesting to note that references to ”gender”, ”queer”, ”misogyn*“ and ”sexis*'” are significantly more prevalent outside of the subsample than within it, as are references to ”feminis*”. Interestingly, doing a more detailed search for references specifically to “data feminism” (including references to Catherine D’Ignazio and Lauren Klein’s (2020) book of the same name) reveals one of the more stark differences between the in- and out-of-subsample groups: Within the subsample there are four articles in total that reference the term, with two of them making a single reference to it, one only using the book as a reference, and one[4] being a critique of the both the term and the book. In comparison, outside of the subsample, there are ample mentions of both the term and the book, with 33 articles in total employing the term in one sense or another, a total of 241 times.

However, references to ”patriarch*“ occur more frequently within the subsample than outside of it. How do we understand this? It seems premature both to analyse this

[4] Tacheva (2022)

as Data Feminism in particular and works building on it to be somehow opposed to anti-capitalist struggle or to a deeper engagement with class consciousness and to take the relatively lower number of references to misogyny and sexism within the subsample to indicate somehow less of a commitment to gender justice and equality from those authors. Instead, it is likely a question of emphasis and lineage.

3.4. Popular Themes

The insights gained above raise the further question about to what degree a critical theory perspective that emphasises capitalism and class is integrated more broadly in the larger corpus of critical AI articles, and to what degree different axes of oppression are tackled in common or by themselves. This relates, in particular, to the relative differences in (collective) emphasis uncovered in Section 3.3 between works focused on class and gender oppression.

A qualitative review of the titles and abstracts of the 95 papers in the subsample generally indicates that many of these papers are in the genre of critical theory as such, rather than being AI papers that incorporate a capitalism/class perspective. In other words, taking the full dataset as a fair view of the field of Critical AI Studies, it appears that critical perspectives on gender (certainly) and race (partly) have been mainstreamed into the field more broadly than have perspectives drawing on a critical analysis of capitalism. A deeper insight into this pattern can be gained with the help of the heatmap plotted in figure 5.

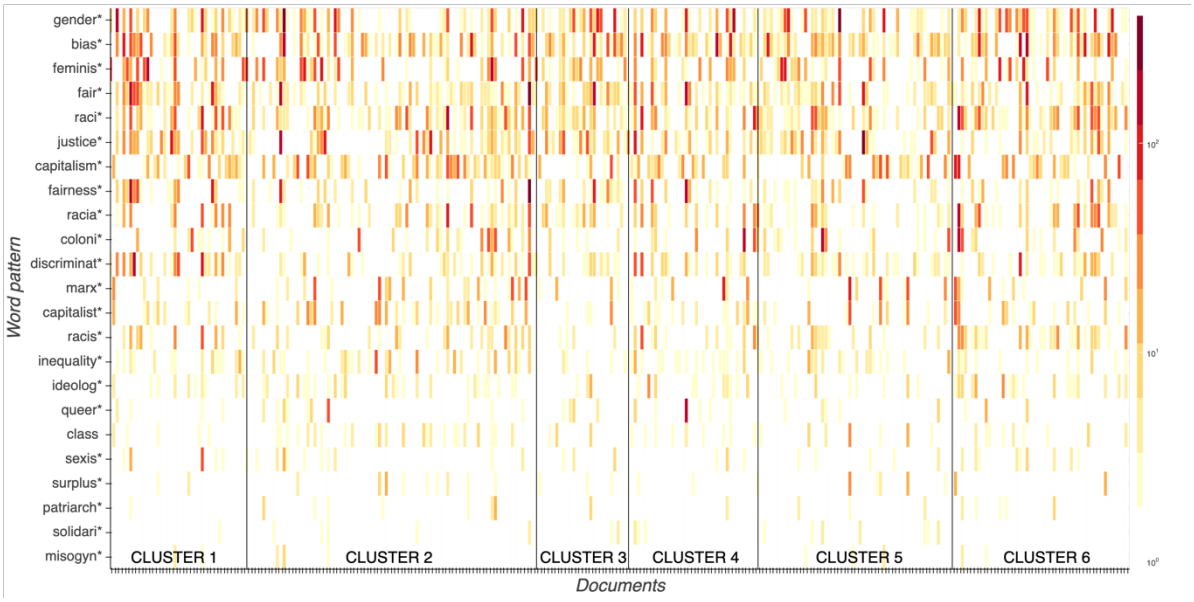

Figure 5: Heatmap based on counts of occurrences of a set of word patterns across the 300-document corpus. Documents are grouped by cluster.

As the figure shows, references to “gender*” and ”feminis*” are very frequent in a large proportion of the critical AI articles, indicating that – as presently constituted – critical AI research is largely focused on the dimension of gender. Furthermore, the high presence of ”bias” as compared to, for example, ”discrimination”, “inequality”, ”racis*”, ”misogyn*”, and so on, indicates that the problematic notion of bias, as discussed by Meredith Broussard (2023) and others, has a strong foothold in substantial parts of critical AI research. Naturally, some of these mentions may be part of texts that critique it. However, somewhat more critically precise and politically salient concepts such as

”sexis*“ are not as commonly used. Furthermore, references to ”raci*”, ”racia*”, and ”coloni*” are also fairly common, if not nearly as frequent as references to gender and feminism. Clearly, however, even if references to ”capitalism*“ (a fairly broad notion that can also be used quite descriptively) occur in a substantial number of articles, references to ”capitalist*”, “class”, and ”surplus*“ are much further down the list.

The methodological strategy for our qualitative review used a two-stage approach. First, we screened the articles based on their titles and abstracts to ascertain their relevance to our aims. Second, we conducted a more detailed examination of some papers where closer inspection was needed to better understand the concepts employed and the context of the research. Through this review, we identified two broad genres of critical AI papers. First of all, papers that can be considered to be “AI research” but with the added critical edge of race, gender, or decolonial theories. Examples of these are the papers “On the Ethics and Practicalities of AI Risk Assessment and Race” (Hogan et al. 2021), “Algorithmic Fairness and Structural Injustice: Insights from Feminist Political Philosophy” (Kasirzadeh 2022), “AI for Social Justice: New Methodological Horizons in Technical Communication” (Graham and Hopkins 2022), and “Asking More of Siri and Alexa: Feminine Persona in Service of Surveillance Capitalism” (Woods 2018).

In such studies, researchers explore how concepts of race, gender, and decolonial theories can be integrated into the field of AI research. This means, then, that such perspectives are incorporated as complementary tools in papers that have the advancement of AI technology or its applications in specific domains as their main focus. Such cases, then, on the one hand, are good examples of how critical theory can aid in analyses in other, more applied fields than its own. On the other hand, however, there is always the risk that any deeper-cutting critique gets suppressed by other aims. Such potential suppression can happen in situations where the primary focus of the research is on advancing AI technology or its applications rather than critically examining the underlying power structures and inequalities that may be perpetuated or exacerbated by these same advancements.

In a less integrated fashion, then, another genre of papers rather match a template of “Marxism-as-applied-to-AI”, and these mostly appear within the 95-paper subcorpus. This genre comes across as quite homogenous (cf. figure 4) and as more free-standing and independent in relation to scholarship about AI development and implementation. Examples of this type of paper are studies such as “Rethinking of Marxist Perspectives on Big Data, Artificial Intelligence and Capitalist Economic Development” (Walton and Nayak 2021) and “Data Capitalism and the Counter Futures of Ethics in Artificial intelligence” (Dixon-Román and Parisi 2020). This type of study is often characterised by fairly deep explorations of Marxist and other critical theories and concepts that are then applied to the case of AI. A potential risk to this style of analysis is that it may be lacking in empirical grounding and validation and might downplay real-world applicability and materialist politics in favour of focusing on developing concepts and theory.

As an aside, but giving some interesting complementary knowledge about the position of Marxist-influenced AI research within general AI scholarship more broadly, we returned to the Scopus database for a supplementary analysis. Here, we queried Scopus specifically in the subject areas of Social Sciences and Arts and Humanities for ((marx* OR capitalis*) AND (ai OR “artificial intelligence”)) in the abstract, title, or keywords, which yielded 330 results, while a similar query for only ai OR “artificial intelligence” yielded 49,254 results. This means, very roughly, that 0.7 % of AI research in these social sciences and humanities would appear to be drawing on Marx’s theories

or otherwise putting the notion of capitalism at the fore. Note, however, that both queries capture many articles that are not *about* AI as such, but rather *uses* AI to investigate some other topic, as discussed in section 2.1.

4. Discussion and Conclusions

The aim of this study was to analyse if and how class and capital(ism) are articulated and positioned in critical AI research. To respond to this aim, we created a corpus of critical AI research, in the form of articles indexed by Scopus. We then made this corpus the subject of largely computational, but also exploratory and qualitative, analysis to uncover prominent patterns both in terms of how class and capitalism appear as prominent, or not, in broader topical clusters of articles and how the language used in articles reflects the articulation and position of issues of, and perspectives on, class and capital. In doing this, our analysis focused on comparing patterns in articles positioned in topical clusters where the analysis of capitalism and class was central and articles that sprung from other areas within critical AI research.

Clearly, the background for us wanting to carry out this study, to get to know more about the degree to which the classical, Marxism-inspired strain of critical theory analysis plays a role in the emerging field of critical AI studies, is that we deem this perspective to be of crucial importance. This is because the recent uptake of generative AI models and subsequent investments to integrate these in a myriad of new applications and business models introduces a whole new set of societal risks, as these systems are inherently inscrutable, with nobody really understanding how they work and how they fail (Dobbe 2022, Bender et al. 2021). Under a veil of corporate marketing anthropomorphising and mystifying these systems' poor functioning, an agenda is rolled out that includes all of society in large-scale experiments that will trigger and solidify many new harms and injustices to individuals, marginalised groups as well as our collective information provision and democratic institutions.

Generally, the emerging field of Critical AI Studies, in contrast, does not take the presently prevailing conception of AI as a given. Instead, it attempts to, on the one hand, question assumptions that underlie most or all of current AI research and interrogate how its conception, deployment, construction and use reifies and reinforces unjust power relations and, on the other, consciously investigate alternative modes of AI development and use with alternative characteristics.

Many strands of this field are at least partially rooted in critical theory, drawing heavily on conceptions of structural and institutional power. In particular, works like *Data Feminism* (D'Ignazio and Klein 2020) and many others in feminist AI and data science draw on ideas from intersectional feminist studies to interrogate how patriarchal and other power structures manifest in AI and propose new approaches to AI and data science based on feminist principles, grounded in an ethics of care and based in solidarity among different groups. Similarly, attempts by scholars such as Abeba Birhane, Syed Mustafa Ali, Renata Avila Pinto and others to decolonise AI and the computational sciences more broadly are partly rooted in similar emancipatory struggles and draw on critical race theory in particular. One of the key contributions of our study is that we investigate the particular role of analyses of AI that see class and capitalism as their prime dimensions of analysis in relation to the more common forms of critical AI research that have increasingly come to incorporate feminist and decolonial perspectives.

A different mode of critical engagement with AI is geared more towards overall rejection, e.g., in the book *Resisting AI: An Anti-Fascist Approach to Artificial Intelligence* by Dan McQuillan (2022). In it, the author argues that since the very construction of

"artificial intelligence", it has been rooted in racist and sexist structures and in colonial and capitalist categorisations and epistemic assumptions on measurability and regimentation. Furthermore, he argues that AI is currently reinforcing, entrenching, and, in some cases, further intensifying capitalist and state-enacted exploitation and abuse. Thus, the whole "AI'" project is seen as tainted, and any technique and strategy to slow down, hinder, or sabotage its use is a valid tactic.

Based on our empirical analysis of how Critical AI Studies that focus on perspectives of class and capitalism relate – in terms of its articulations and positioning – to other strands of critical AI research, we have been able to come to the following conclusions:

- Articles focusing on capitalism and class stand out as a fairly distinct subgenre within the field of Critical AI Studies (figure 3).
- Within this subgenre, we identify a scholarly discourse which bears the characteristics of classic (post-)Marxist critical theory and which draws on an analytical vocabulary centred around class and capitalism (antagonism, struggle, labour, commodities, surplus, etc) (figure 4).
- An analysis of the language used in articles within this subsample, as compared to that in articles outside of it, shows traces of a discursive rift whereby many of the core terms in the subsample are relatively confined to those core papers, while concepts relating to gender, race, and (de)colonialism are more broadly present in the corpus as a whole (table 1, figure 5).

In sum, then, the empirical study that we have carried out to improve the understanding of which analytical strands within critical AI studies are prominent, as well as how they are integrated (or not), has shed light on one overarching and striking pattern. While on the one hand, themes that relate to gender, race, and (de)colonialism have – by comparison – found a certain degree of representation, and integration, with topics and concepts relating to what one might label "mainstream AI research". On the other hand, Marxist research on AI has not entered this mainstream to the same extent. As seen in figure 4, these discourses are certainly characterised by a pronounced (post-)Marxist critical theory undertone, replete with its analytical lexicon. Yet, the relatively confined usage of core terms, as contrasted in figure 5 and table 1, suggests a divide which risks creating or proliferating silos within the field. Therefore, we believe that it is crucial for the future and more holistic development of critical AI studies that analyses rooted in the frameworks of class and capitalism do not remain relegated to the peripheries. Instead – and ideally – they should be seamlessly integrated into the very mainstream of AI research. Doing so will provide avenues for understanding the potential for broader forms of solidarity by relating feminist, anti-racist and decolonial with anti-capitalist and class struggles. Only if this integration is achieved, we can ensure a comprehensive and actionable understanding of the implications of artificial intelligence and its underlying computational infrastructures, capturing their multifaceted and globally expressed socio-economic, ecological, and political repercussions.

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Writing Back Against Amazon's Empire: Science Fiction, Corporate Storytelling, and the Dignity of the Workers' Word

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Abstract: Since its founding in 1994 as an online bookstore, Amazon has "revolutionised" not only the market for literature but also expanded aggressively and transformatively in sectors including consumer retail, film and television, groceries, logistics, robotics, surveillance, AI, and web services. This growth and expansion is grounded in the firm's internal and outward-facing rhetoric about its leading contribution to a brighter future, a narrative deeply inspired by the genre of science or speculative fiction (SF). But Amazon's utopian vision is largely experienced as a dystopia by most of its rank-and-file workers, who labour under exploitative conditions of surveillance, robotization, and relentless managerial control. Hence our team inaugurated the Worker as Futurist project to support rank-and-file Amazon workers to read/watch SF stories to collectively understand their employer and its world, and also to write short, SF stories about "the world after Amazon." In this preliminary report on the project, we explain the inspirations for the project and reflect on some of what we have learned from the participants, as well as some implications for the futures of platform workers generally.

Keywords: Amazon, science/speculative fiction (SF), workers' inquiry, writing, big tech, logistics, future

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1. Introduction

Whether measured by market capitalization, by number of employees, by revenue or by transactions, Amazon is among the world's largest corporations. Since its inauguration in 1994 as the online bookstore that forever changed book sales and publishing, it has applied its data-driven, customer-satisfaction-oriented approach to an expanding number of industries and sectors, "revolutionising" retail, logistics, robotics, film and television, groceries, web services and cloud computing, microtasks and more (Stone 2013; 2022). Today, the firm represents part of an emerging "big tech" oligopoly on the world stage. Its workers pay the price. Journalists, workers, and their representatives report gruelling conditions and high injury and burnout rates. This is thanks largely to the firm's relentless quest for efficiency as dictated by data- and algorithmically-empowered managers obsessed with delivering clients fast and flawless service, warehouse workers, drivers who staff its logistics empire, and the tech teams that keep its servers humming (see Alimahomed-Wilson and Reese 2020).

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This much is familiar to anyone who has followed the firm's meteoric rise. Less familiar is how important science or speculative fiction (SF) has been to the firm.[1] Jeff Bezos, Amazon's founder and former CEO (now executive chairman) has been a lifelong SF fan (Stadler 2022; *Wired* 2019) and has, throughout the firm's history, leveraged optimistic SF themes and rhetoric into new product ideas (notably Alexa, the company's pathbreaking voice-recognizing home assistant device). This compelling futuristic rhetoric and mobilisation of the "technological imaginaire" (Flichy 2008) has enchanted shareholders for decades, which has been crucial to the firm's aggressive expansion into ever more sectors of the economy (see Stone 2013 and 2022). In the company's story of itself, Amazon is not just making money and satisfying customers, it is fashioning the future; it's "Day One" philosophy, which insists the firm and its executives must always act as if they are restarting from scratch and never become complacent in routine, indicates a kind of fanatical ambition to be on the bleeding edge, an obsession not only with being contemporary but being speculative (Dumaine 2020). Bezos' own private space corporation Blue Origin, financed almost entirely from his share of Amazon's profits, provides another layer to his utopian fantasy: firms like Amazon are part of bringing about a capitalist future that will see humanity become a starfaring species thanks to the enlightened leadership of visionary billionaires (Snow 2023).

These corporate utopian dreams are largely experienced as a dystopia for the Amazon's rank-and-file workers, who across its many holdings and their periphery endure chronic overwork, algorithmic surveillance, profound exploitation and fundamental insecurity (Alimahomed-Wilson and Reese 2020; Henaway 2023). In 2018, the company made headlines when it was revealed it had patented designs for a chain-link cage with a robotic arm, intended for potential use in warehouses, allegedly to protect workers handling dangerous and heavy materials. The imagery cemented for many the way Amazon's sunny corporate rhetoric of relentless technological advance is, on its shadow side, the stuff of cyberpunk nightmares (Day and Romero 2018).

This paper takes it as given that Amazon represents the cutting edge of many of the most deleterious aspects of twenty-first century platform capitalism, and we leave it to others to detail the company's many infringements on workers' rights. Instead, we wish to focus on how the firm, through its actions and its rhetoric, seeks to gain command over the future, mobilising the tropes and conventions of the science fiction genre in order to redefine work and accumulation. We do so in order to contextualise, discuss, and reflect on our ongoing participatory research and research-creation project, Worker as Futurist, which has, since early 2023, supported rank-and-file Amazon workers (delivery drivers, warehouse workers, techies, copywriters and more) to write short SF about "the world after Amazon." We aim in this paper to make clear why we believe that SF writing, particularly when undertaken by workers, is particularly well-suited to questioning, resisting and confronting forms of technologically-driven platform capitalism today.

In this paper, we aim to shed light on several interconnected questions. How should we characterise Amazon relative to broader trends in digital capitalism and workers' struggles within, against, and beyond it? How should we account for the role of SF in Amazon's development and the recomposition of digital capitalism more broadly? After

[1] Our use of the acronym SF preserves the fraught ambiguity between science and speculative fiction (see Mancuso 2016), and also signals the broader set of "modes" of critical speculative fabulation that operate beyond the realm of fiction. On this, see Truman 2019.

addressing these questions, we present the Worker as Futurist project in general. However, we stop short of sharing or analysing the workers' writing because at this point in the project, we are still awaiting the worker-writers' final drafts. Instead, we reflect on the broader scope, ambitions, and approach of the project and its implications for the study of digital workers now and scholarly activism in the future (see also Haiven, Webb and Benivolski 2022).

Our team is made up of humanities scholars, creative writers, and curators and our project is participatory insofar as it places the highest value on the transformative research experience itself, rather than the collection and analysis of data. In future papers we will share and reflect on the specifics of the writing of the workers we supported as well as the methodology as a whole. This paper may be read less as a formal social-scientific research article and more as a reflection on research in progress, setting forth the interdisciplinary constellation of theoretical, methodological, and empirical works that have influenced our approach, rather than seeking to make a specific intervention in or contribution to a particular academic debate. In future publications, we plan to share the data we gleaned from our project (in the form of an analysis of the worker-participants' published writing) and reflect on the methodology in greater detail.

In brief, since early 2023 our team has supported thirteen rank-and-file Amazon workers to write short, SF short stories about "the world after Amazon." Participants were recruited and took part in the project entirely online and had all worked or were still working for Amazon, or earned wages that were largely or entirely dependent on Amazon, but were not managers. Worker-writers were remunerated to join our team for online knowledge- and skill-building sessions, then work with our team and professional literary editors to draft, workshop, revise and edit their short fictional works. We will publish most of these stories in print, online and in audio format in the second half of 2024. This process was accompanied by the simultaneous production, in 2023, of a supplemental research podcast, *The Workers Speculative Society*, in which our team interviewed experts on Amazon, on the politics of SF, on creative writing as a form of activism, and on labour struggles in the twenty-first century.

2. Amazon as Dystopia

How should we characterise Amazon relative to broader trends in digital capitalism and workers' struggles within, against and beyond it?

Today, global movements are at a high water mark in terms of organising resistance to Amazon. At an October 2023 global summit in Manchester, organised by the Progressive International consortium of social movements and the UniGlobal alliance of trade unions, representatives from struggles in North America, Europe, and Asia met to coordinate around the slogan "Make Amazon Pay." While several important initiatives and independent trade unions were not at the gathering (especially those operating on a more grassroots level), it nonetheless represented a wide plurality of efforts to confront the power of one of the world's largest corporations. Amazon has, over the past thirty years, "revolutionised" capitalist retail, logistics, robotics, AI, web services, groceries, and other industries. Today, it emblematizes a dangerous and pervasive twenty-first century platform capitalism where the hardware and software of companies like Meta, Alphabet, or Amazon act as platforms at the centre of digital economic circulation (Langley and Leyshon 2017). By occupying this digital and economic space it has leveraged its staggering wealth, market valuation, and reputation to "disrupt" ever more sectors of the economy based on a strategy that combines ruthless competitiveness with a data-driven obsession with customer satisfaction (see Stone 2022; Ali-

mahomed-Wilson and Reese 2020; Delfanti 2021). In this sense, Amazon is both indicative of wider trends in the recomposition of labour and power in twenty-first century capitalism and also unique in important ways.

The costs of this approach for workers are, by now, well known. Blue-collar workers at Amazon's warehouses and throughout its logistics empire, while often more highly paid than at competitors, endure a punishing workplace where the pace of labour is set by algorithmically powered robotics. This has led to among the highest injury rates in the industry (Delfanti 2021). Drivers, most of whom work indirectly for the company through completely subordinated "independent" intermediary companies, are forced to use Amazon digital systems to coordinate deliveries at a pace that rivals the worst platform exploitation in the transportation sector (Reese and Alimahomed-Wilson 2022). Even white-collar corporate employees complain of a relentless workplace culture that demands constant success, efficiency, and innovation, modelled on the persona of the corporation's obsessive founder Jeff Bezos (Kantor and Streitfeld 2015; Stone 2022).

One of Amazon's slogans, to be found painted on the wall of nearly all of its offices and warehouses, encourages workers to "work hard, have fun, make history." But it is abundantly clear that only the first imperative is available to the vast majority of the company's workers. Officially, these numbers are somewhere in the range of 1.5 million, but this figure is deceptive (Goldberg 2023). If we include the much broader range of people who work on the company's proprietary systems (including Kindle authors, Amazon marketplace sellers, and gig workers on its M-Turk platform), or that work for subcontracted firms (like most of its global delivery fleet)—in other words whose labour generates profit for Amazon but who are not directly employed by the firm—it is easy to estimate Amazon's global workforce in the millions. As workers contend with exhaustion and injury-inducing scheduling, calculated by the company to generate as much labour power as possible and to prevent fraternisation that might lead to collective action, the responsibilities of everyday life are downloaded onto already strained support systems. As Chua and Cox (2023) argue, in the United States, the terrain of struggle against Amazon warehouses has in many ways shifted from the shop floor to the neighbourhood, from the site of economic production to the expanded field of social reproduction.

Amazon's antipathy to workers' power is also the stuff of legend and the company has notoriously fended off major efforts by well-organised unions. In the United States, despite Amazon Labour Union's unionisation victory at a Staten Island warehouse, the company's successful and high-profile anti-union campaign in Bessemer, Alabama remains the norm (Fuchs, Dannenberg, and Wiedemann 2022). In Germany, while workers at Amazon have been unionised for over a decade, the firm has systematically stymied attempts to win a collective agreement and uses casualisation and a reliance on precarious migrant workers to undermine such efforts (Kassem 2023).

The success of Amazon is summarised best in its ability to bring the ethos and techniques of a financially-driven West Coast American technology firm to bear on a wide variety of industries not immediately connected to technology (Alimahomed-Wilson, Allison, and Reese 2020). Since opening as an online bookseller in 1994, Amazon's retail operation has expanded to include supplying practically everything that can be carried by an individual human, from iPads to diapers. Its purchase of Whole Foods, and expansion of the Amazon Fresh brand, is emblematic of its desire to insinuate itself into the fabric of the everyday lives of consumers. Regardless of the field, Amazon touts its own unique approach and success as being based on an obsession with customer experience. However, behind this PR-speak is its collection and analysis of

massive amounts of data, used to not only increase efficiency and keep prices low but to develop aggressive, targeted market interventions aimed at annihilating competition (Stone 2022).

This approach is most evidently seen in the firm's expansion into film and television. Leveraging its own Prime platform, and informed through rigorous data collection and powerful computing, it has become one of the world's top entertainment producers by creating content that appeals to discrete market segments (Klatt 2022). These strategies have also shaped the company's expansion into other fields including healthcare, insurance, and more. In recent years, Amazon has even offloaded the risk of buying and warehousing stock by leveraging itself into a warehousing and fulfilment mainframe for hundreds of thousands of "independent" sellers who are locked into Amazon's systems and pay a heavy price (Silva 2023).

Amazon might be seen to be creating a walled garden or a heterotopian form of capitalism by replacing the chaotic free market with a clean, customer-focused proxy. In essence, it is leveraging its massive size, wealth, and reputation into a transnational commercial empire *within* capitalism (see Giblin and Doctorow 2022; Silva 2023).

3. Digital Capitalism and Speculative Fiction

How should we account for the role of SF in Amazon's development and the recomposition of digital capitalism more broadly?

The behemoth's slogan, "work hard, have fun, make history" is indicative of the firm's focus on the future and its highly ambitious goals to transform the economy and perhaps society at large. Since Amazon's earliest days, its visionary founder Jeff Bezos has never shied away from language reminiscent of or taken from SF (Roberts and Andrews 2021). Such prophetic language is mobilised in order to convince shareholders, regulators, and employees that the firm is what we might, borrowing from Walter Benjamin, call an "angel of creative destruction:" blown out of heaven by the forces of capitalist innovation, both an agent of and a witness to the ruination that came before (Benjamin 1969; see Haiven 2014).

This future orientation has recently been brought to light by studies by Alessandro Delfanti and Bronwyn Frey (2021) and also by Cecilia Rikap (2020) that focus on the firm's abundant publicly filed patent applications. The patent application for the cage-crane is only one among many futuristic designs that focus on ever more precise control of space and time in the warehouse and the broader logistical field aimed at expediting and rendering ever more efficient the interval between a customer's wish and its fulfilment. However, more broadly these patent applications, the bulk of which simply aim to claim speculative intellectual property rights to hedge future risks, reveal a firm that invests heavily not only in short-term research and development but in an expansive vision of a transformed future.

But this is only one way in which the firm aims to dominate the future itself. It is also important to note Amazon's control over discourse and the imagination. The firm is almost certainly the world's largest purveyor of words, seen in its unparalleled domination of global book sales, the unrivalled popularity of its proprietary ebook platform Kindle (on which tens of thousands of authors publish exclusively), its almost total domination of the audiobook market, the popularity of its acquired user-generated platform Goodreads, and its Amazon Web Services (AWS) cloud computing division, which supplies cloud infrastructure to an estimated 50% of the public-facing internet (Runkevicius 2020). In this sense, Amazon's influence over literature and social narrative cannot be underestimated in that it mediates a significant percentage of the words humans read today. Literary critic Mark McGurl (2021) insightfully looks to the firm's

own narrative of itself and recognizes many of the hallmarks and tropes of twentieth century American commercial SF, such as the triumphant march of technology, space-conquering hyper-masculine heroes, and the projection of current social realities into the future mystified as the natural and inevitable evolution human nature.

The kernel of Amazon's obsession with the future is Jeff Bezos who is, according to his own testimony and those of his friends and colleagues, an "obsessive" SF fan (see Stone 2013 and 2022). Indeed, he initially considered naming the firm "MakeItSo.com" after the catchphrase of Jean-Luc Picard, the iconic captain of the Enterprise in *Star Trek: The Next Generation* (broadcast 1987-1994), after whom Bezos is also reported to have modelled his own bald-headed appearance and assertive and demanding demeanour (*Wired* 2019; Roberts and Andrews 2021). Furthermore, Amazon's path-breaking voice-recognizing "home assistant" device Alexa, was modelled on the talking computers of that television series and its predecessor (Stone 2022). In many ways, the *Star Trek* series is responsible for many of the SF tropes and references that are enthusiastically sprinkled throughout the last quarter-century of Bezos's famous annual letter to shareholders. While on the surface such allusions are farcical, this rhetoric of technology and hope—to travel where no man had gone before—were pivotal in charming the financial sector essential to Amazon's breakneck expansion throughout America and around the world (Stone 2022).

In post-war American capitalism, SF was seen as a largely niche and somewhat distasteful commercial genre (see Vint 2021). Today, however, it has moved in many ways to the centre of what we might call capitalist storytelling (Jameson 2005; Davies 2018; Michaud 2020). Certainly, it is the case that, since the late 1990s, new advances in computer animation have allowed SF films and tropes (for instance in superhero films) to dominate the box office and streaming rankings, and SF franchises like *Star Wars*, *Star Trek*, or *Dune* to become major sources of income across a range of sectors. Beyond this, the new generation of capitalist leaders who capitalised at the intersection of high finance and big tech (by their own admission) grew up with a great love of SF narratives in books and film—a passion for the genre that continues to profoundly shape their world-view, ambitions, and self-presentation. Figures such as Bill Gates, Elon Musk, Peter Thiel, and Jeff Bezos are all candid about and celebratory of their debt to SF and unashamed to cast their efforts in the most bombastic terms drawn from that genre (Lepore 2021). The space race between Musk and Bezos has seen both cast themselves as conquering space heroes, enlightened billionaires who not only aim to compete for glory but, indeed, help humanity transcend its "blue origins" on Earth and head for the stars (Stadler 2022).

However, what often goes unsaid, but is nonetheless clear, is that capitalism and its angels will succeed where democratic states failed: space will be colonised by capitalism (Snow 2023). For these prophets of progress, capitalism is seen as a system that humanity's naturally acquisitive and competitive nature. What equally goes unsaid, is who will be left behind on earth. It is a telling irony that one of the most popular and complex depictions of class struggle in space in film and television, *The Expanse* series, was allegedly single-handedly rescued from cancellation by Bezos (Snowden 2020). A huge fan of the series, upon hearing the news of its impending cancellation at a Hollywood dinner, he ordered his company's studio to buy the franchise, leading to an additional three seasons. The series' iconic depiction of the violent rebellion of an oppressed working class and the villainous appearance of an unscrupulous tycoon seemed to have titillated, rather than disturbed Amazon's founder (on the politics of the series, see Woodcock 2023).

Beyond the optimistic SF rhetoric of today's tech firms rests a cynical and calculated propaganda. When met with the high costs of its operations to workers, communities, legacy companies, and whole markets, Amazon constantly defends and presents itself to regulators and the media as a savvy but largely helpless angel blown by the winds of capitalist innovation. The apocryphal words attributed to Bezos, that "Amazon didn't happen to bookstores, the future happened to bookstores" are emblematic of this approach, which neatly dodges responsibility for the calamitous effects of the firm's activities (Stone 2013). Such an articulation conveniently combines a linear narrative of technological innovation with the supposedly progressive force of the market in the form of an active, benevolent, if occasionally violent entity, simply known as "the future." Amazon here is merely an avatar or agent of "the future." Like a force of nature, capitalist "progress" is ruthless, necessary and inevitable. But progress in whose interest, in what direction? And who pays the price? This perspective has recently animated a new wave of "techno-optimism" precisely at the intersection of high tech and high finance, which makes explicit what is often left unsaid: the linear but disruptive ascent of capital, technology and progress is a necessarily violent and destructive process which, while it may lead to death and catastrophe for many, must not be inhibited because, in some mathematically certain future, it will produce not only untold wealth and possibility, it will permit the transcendence of the human body and the emergence of a new form of hybrid life: the fabled "singularity" (Andreesen 2023).

It can be tempting to see such speculative prognostications as merely the vanity projects of tech billionaires and their hangers-on. But we should also attend to the way SF and narratives help recompose capitalism in more practical ways. Such stories and tropes help cohere a corporate culture around "making history" in ways that can, for example, convince highly skilled employees to accept stock options in lieu of wages, based on their future returns. It even motivates blue-collar rank-and-file employees, who take pride (in spite of the harsh working conditions) in working for a firm that is changing the world and using state-of-the-art technology to do it. At a certain point, SF narratives help inspire and shape the strategies of corporate leadership. The success of this discourse can be seen in terms of its effects on governments insofar as it was parroted by the hundreds of municipalities that entered into a bidding war to charm Amazon into establishing its secondary headquarters in 2019 (Woolf 2019). More generally, it is also echoed in the speeches of politicians who have publicly praised the firm's commitment to "innovation" (and fears of stifling it) as an excuse for failing to tax it appropriately or pursue meaningful regulation and anti-monopoly proceedings against it (until very recently, at least) (see Culpepper and Thelen 2020).

Most profoundly, the SF-inspired rhetoric is evidently immensely popular with investors, whose cash is needed to drive the relentless and rapid pace of corporate expansion (Stone 2022). The resonance of this myth of progress, technology, and limitless growth and potential with the investor community can not be downplayed. Without such enthusiasm, Amazon would likely never have been able to expand so rapidly. This expansion is thanks in no small part to Amazon's highly unique financial practice of forcing investors to do without their dividends and satisfy themselves solely with ever-rising share prices and occasional buy-backs, allowing the company to retain profits to be ploughed into development and expansion.

Given all these significant political-economic functions of the firm and its founder's futuristic rhetoric, we must consider the power of what might be termed "corporate storytelling," taking into account the way that digital capitalism takes up, renovates and exploits humans' profound power to transform self and society through narrative (Salmon 2017; Wynter and McKittrick 2015). What is necessary then, is to dwell, in

tandem with Will Davies (2018) and his collaborators, on the "economic science fictions" that have permeated governmental and industry discourses. Such discourses have moved from the margins, closer to the centre of a financialized moment of capitalism that is, after all, built fundamentally on speculation about the future. In the latter half of the twentieth century, the American Empire and Soviet Bloc presented two rival "dreamworlds," competing to present their system as the fulfilment of the promise of modernity (Buck-Morss 2000). More than three decades after the "end of history," in an era of profound pessimism and cynicism towards collective potential, this scenario has perhaps been replaced by a warring archipelago of corporate and billionaire fantasies, emblematized by the privatisation of what were once public speculative projects. Today, the orientation of space exploration, the elongation of lifespans, and the birth of artificial intelligence are set by corporate and financial magnates whose massive and unanswerable power appears to rival or exceed the greatest fears of SF authors of the past (see Torres 2023).

Taken together, an important but undeveloped hypothesis emerges: The case of Amazon reveals that SF may be a non-trivial part of the way capitalism is recomposing itself in an era of financialization and digitization. Capitalism is a system and its modes of reflexive self-transformation are institutional. Elsewhere Haiven (2011) has framed the financial sector as "capitalism's imagination." In other words, it is a set of institutional networks that affords the system a sense of its own potential futures and a means to intervene in them, albeit in a profoundly inhuman, contradictory, and chaotic way. But, especially in a moment when the concentration of capitalist wealth is at an extreme, it is essential to attend to the way individual capitalist actors, notably extremely rich and influential billionaires and investors, themselves reflect on the future and calibrate their strategies and choices around this imagination. And here the SF genre appears to have an outsized and in many ways unrivalled influence.

Whatever the case, as we have seen, for workers at Amazon, the "technofeudal" (Morozov 2022; Varoufakis 2023) rule of these billionaire's companies is essentially the stuff of dystopian speculative fiction. This brutalising work, which has catastrophic effects on workers bodies and has seen the firm condemned for its injury rates and high employee turnover, is packaged in a saccharine corporate rhetoric that addresses exploited workers as equal "Amazonians," "associates" in the company's noble mission to provide the unrivalled best for customers (and most Amazon workers are, of course, also customers) (Henaway 2023). Corporate culture promotes a focus on safety and well-being that places nearly all responsibility on the workers themselves, and that champions workers' forms of mutual aid and solidarity as part of the company's caring culture (rather than, as is usually the case, in spite of that culture) (Chua and Cox 2023; Henaway 2023).

This wrapping of a dystopian reality inside of utopian rhetoric is important because, when combined with the company's aggressive techniques to prevent not only unions but even the kind of worker interactions that might lead to a platform for unionisation or organising, these narratives typically go uncontested. In our research, we learned that workers gain meaning and dignity from the utopian rhetoric of Amazon, while at the same time, being sceptical and even resentful of it. In the absence of other narratives to help explain their suffering and sacrifice, Amazon's preferred narrative becomes a resource for many workers that helps them sustain themselves and feel a sense of meaning and community. Labour and community organisers, therefore, would be well advised to attend not just to the falseness of this narrative, but also to the work the narrative performs and the uses to which workers put this narrative. It will likely be important for such organisers to not only promise workers "bread and butter" gains

(improvements to wages, scheduling, working conditions, health and safety, recourse for disciplinary procedures, etc.) but also provide other dignifying narratives that focus on collective struggle and have a hopeful horizon.

4. Worker as Futurist

The Worker as Futurist project was initiated against the backdrop of Amazon's ongoing adoption of the rhetorics of the technological imaginary seen in optimistic SF. While these rhetorics are often grounded in messianic figures radically disrupting and reshaping the future, the truth of the situation is that these utopian visions are built on the backs of the firm's rank-and-file workers, who have no influence or control whatsoever over the future they are compelled to create. But what if these voices were heard? What would they say about the world after Amazon? And what exactly would the process of supporting rank-and-file Amazon workers to write and publish these short speculative stories be?

An emerging methodology developed by Black and racialized activists—including adrienne maree brown and Walidah Imarisha (2015) and more recently Lola Olufemi (2021)—has productively mobilised the spirit of an interventionist and activist SF. These methods see SF writing workshops as a space to encourage and cultivate the radical imagination: the collective power to envision other futures that might inspire and guide social justice action and activism in the present. This is especially important for groups that have, historically and today, been denied influence over the future within dominant systems. Notably, in the case of brown and Imarisha as well as Olufemi, Black people who must contend with the forms of domination and oppression that emerged from the transatlantic slave trade, colonialism, and the particularities of anti-Black racism. Within the racist worldview that enabled these horrors and that continues to plague our world, Blackness is framed as the antithesis of white modernity, which claims science, progress, and intelligence as its domain (see da Silva 2007). These are tropes that have historically (and still to this day) shaped the history of SF, which typically (and with increasing exceptions) presents future worlds based on normative ideas and ideals of race that not only exclude racialized people but reaffirm the values, beliefs and ideologies that led to that exclusion in the first place (Carrington 2016). Thus, the writing of SF by racialized people is an act of defiance and of common courage. An insistence that our collective imagination of the future is a political matter and a zone of contestation, not simply the "scientific" extrapolation of selectively chosen current trends in technology and society.

Inspired by this approach, our Worker as Futurist project places the tools of SF writing in the hands of another oppressed and exploited group: workers at Amazon. To be clear, the domination faced by these workers is not the same as that faced by Black and racialized people—although many workers at Amazon are also Black or racialized, and their experience of domination is intersectional (Alimohamed-Wilson and Reese 2021). In that sense, we were roused by the long tradition of social and socially-conscious SF that focuses on workers and the working class. Mary Shelley's seminal *Frankenstein* is widely acknowledged to have been influenced by both the Luddite worker rebellions in her native England as well as the controversial ways bourgeois scientists would experiment on the corpses of poor and working-class people. Fritz Lang's pivotal silent film *Metropolis* centres around a workers' revolt in a futuristic city. In the twentieth century, SF novels and short stories were largely marketed as "light" or low-brow working-class entertainment, and often included working-class characters and situations, a tendency which would be politicised in the early work of Ursula K. Le

Guin in novels like *The Dispossessed.* More recently, popular SF texts like *Snowpiercer* or *The Expanse* highlight class struggle. Our project aims to take up and explore this genealogy and the particular connection between SF and the world of work.

As noted, the Worker as Futurist Project aims to support rank-and-file Amazon workers to write SF short stories. It builds on a pilot project we undertook in the fall of 2021 to understand how spaces might be created to empower workers to critically engage with pieces of SF. Having successfully recruited about twenty five current and former, rank-and-file Amazon workers we created a "film club" where they would view and collectively discuss SF movies, TV shows, and independently made video games. The film club took place over five weeks and coincided with the exploding popularity of the South Korean survival drama series *Squid Game*. This served as an entree into the first week's discussion of exploitation, class disparity, and capitalism. *Squid Game* revolves around a secret contest between hundreds of players, all of whom are experiencing financial distress, risking their lives taking part in a series of deadly children's games for the chance to win a large sum of money. In subsequent weeks we also had participants watch the 2013 movie adaptation of *Snowpiercer* which was based on a French post-apocalyptic, climate fiction graphic novel, and selected episodes of *Black Mirror* and classic *Star Trek* exploring issues of labour and life under capitalism, and also play the online game *To Build a Better Mousetrap,* by radical game designer Paolo Pedercini, which critiques the oppression and automation found in factory work.

The film club meetings were facilitated by the project organisers and followed a consistent formula. Each week the sessions were divided into sections where the show of the week would be described and summarised followed by a discussion of the material which was often directed by pre-crafted questions or activities. For example, participants would be asked to imagine their life in the year 2268 (the year in which *Star Trek* is set) or to reorganise the layout of the *Snowpiercer* train which had been dominated by a classist hierarchy where the have-nots are relegated to what amounted to the luggage cars and given nutrient-rich sludge while the rich drink champagne and eat fresh sushi harvested from fish tanks on board.

While such directed activities yielded wide-ranging and productive discussions with the participants, the main purpose of the pilot project was to trial-run a set of methodologies around workers' inquiry and convocation method of imagination. Based on the idea that "the radical imagination is something we do, and something that we do together" (Khasnabish and Haiven 2012, 411) the project sought to "convoke" together Amazon workers by engaging with SF texts in the hopes that new, alternative visions emerge.

Building off the success of this pilot project, reflections from organisers, and feedback from participants in exit interviews, project organisers launched the Worker as Futurist project in early 2023. Over the course of eight months, the project focused on supporting 13 rank-and-file Amazon workers to write short, speculative fiction stories about "the world after Amazon." To facilitate this process, participants first took part in a series of capacity-building and consciousness-raising workshops. While those who were invited to join the project from a larger pool of applicants had a demonstrative interest in SF, writing abilities across the group varied greatly. The purpose of the workshops was to introduce key skills around world-building, character and plot development, and descriptive writing. For example, participants had been asked to read Ursula K. Le Guin's provocative short story "The Ones Who Walk Away from Omelas" about a utopian city that required the pain and suffering of a single child. During the online session, they were placed into breakout rooms to discuss not just the ways in which the story is a parable for a capitalist society where the wealth of the few is predicated

on the labour and oppression of the many, but also how Le Guin uses imagery and the way the narrator invites the reader to co-create the utopia. Following this, participants were given out-of-session homework to create a response to Le Guin's Omelas (inspired by author N.K. Jemisin's famous response story) through writing, drawing, video, audio, or collage. These responses were then uploaded online to an instant messaging server where all participants could take in and comment on their peers' submissions.

Other successful workshops included using Stuart Candy's "The Thing from the Future" card game to imagine interesting, funny, or thought-provoking ideas for "things" from the future. Drawing on SF author Frederik Pohl's famous quote, "a good science fiction story should be able to predict not the automobile but the traffic jam," participants were able to use the productive space that play creates to make strange and practice world-building in a low-stakes environment. In addition to writing workshops, a series of speakers were also brought in each session to speak with and discuss about Amazon. These speakers were predominantly academics or labour organisers who focused on Amazon, its business practices, and the world that companies like it are purposefully creating. With the end goal of the Worker as Futurist project being a series of short stories crafted by participants about how they imagined the world after Amazon, the speakers were meant to add extra insight to the expertise that participants brought with them from working within the proverbial belly of the beast.

After these sessions and thus equipped, over a series of 12 weeks participants created their 1500-2500 word short stories. During this time, they were given a series of internal deadlines to write two drafts on which they would receive substantive feedback before a final version was due. To help facilitate this process, bi-monthly communities of practice were set up where participants could drop in during set times to discuss their work with their peers and organisers. Throughout this process, a series of checkpoints were created by organisers so that if participants regularly took part in sessions and submitted drafts and final versions of their stories, they would receive honorariums for their participation. Of the thirteen participants, nine completed and submitted final versions of their short stories.

Currently in the editing process, project organisers are looking to self-publish these stories in a collection that will include commentary by other academics and union organisers. While this remains in the first stages of development, the short stories themselves have yielded a few productive and intriguing insights into the workers' inquiry and convocation process and how SF as a form of fictioning might give shape to new radical subjectivities.

5. The Potentials of Workers' Creative Writing

Why write SF with Amazon workers? The nature of this project is itself speculative: we are aiming to discover the answer to this question, rather than begin with an answer. Our hypothesis is necessarily and purposefully vague: many factors convince us it is worth the experiment. How might this process be transformative or beneficial to workers, individually or collectively? How might the experience or the results (the short stories) help inform workers' struggles in the future? To what extent can workers' speculative writing supplement a broader movement against Amazon's power? Does the writing of fiction (and particularly SF) reveal some encoded, embedded, or embodied knowledge about Amazon and the broader order of digital capitalism that might prove motivating, sustaining, inspiring, or even strategic? Can such a process inspire or convoke the radical imagination, and if so with what consequences and benefits?

In recent years, SF has been lauded for its capacities to open new horizons of the imagination in ways that might potentially trigger social action (Vint 2021). There have been a proliferation of activists and participatory action research projects that encouraged members of marginalised groups to read, discuss, and write SF for this reason (brown and Imarisha 2015; Truman 2021). To our knowledge, however, none of these has yet concerned itself with workers as such (though, of course, most people who are marginalised are also workers, and usually highly exploited). Indeed, in the Worker as Futurist Project we also discuss and contend with the fact that the workers who participate are also many other things: parents, migrants, racialized, gendered, poor, educated (or not), and so on.

And yet we have chosen to focus particularly on workers because we are convinced that today's form of capitalism, especially as expressed by Amazon, places them in a unique position. And just as Amazon proceeds from its own chosen SF narrative, so do we. In many twentieth century SF stories, characters possess (or perhaps are possessed by) some important knowledge which they are not immediately conscious of. In Philip K. Dick's 1966 short story "We Can Remember It for You Wholesale," adapted into film in 1990 as *Total Recall,* the main earth-bound character slowly realises that what he imagines are his personal dreams to visit the colony of Mars are actually recollections. Despite his employers erasing his memory to conceal his past as a covert agent, these flashbacks persist, posing a threat to the regime about which he, unwittingly, holds damning information. In the first *Star Wars* movie, the innocuous robot worker R2D2 is secretly carrying plans that will allow rebels to destroy an evil empire's seemingly invincible space station. In Dick's famous 1968 *Do Androids Dream of Electric Sheep,* adapted as *Blade Runner* in 1982, the main character's skill at hunting down rogue androids stems from the fact (which he slowly discovers) that he is also, in fact, an android. In Douglas Adams' hugely influential *Hitchhikers' Guide to the Galaxy* the main character, a human, slowly discovers that he is being relentlessly pursued through space by entities who created the earth as a giant organic supercomputer built to compute the elusive meaning of life, precious knowledge that he (a fragment of that computer) unconsciously possesses. In all these popular texts and many more, the protagonists have a valuable unconscious or embodied knowledge that needs to be decoded, redeemed, or recognized in order to make some profound change to the world. While on the one hand rejecting the individual macho heroism and metaphysical bombast of much of twentieth century SF, we do want to borrow this trope to think through the potential of Amazon workers and the knowledge they might possess, and its utility to struggles within, against, and beyond twenty-first century digital capitalism.

Perhaps Amazon workers, by virtue of the fact that they are compelled to labour in dystopian conditions to reproduce someone else's utopia, bear within themselves some unconscious form of knowledge about how to fight for different futures? Here we are curious about what the body knows that might not yet surface into conscious thought, but that might emerge in creative expression. While we reject the idea that some expert needs to come and mine this stream of data, we do want to hold open the possibility that these workers might produce some insights into the world Amazon is creating—insights that might not be otherwise available to those who struggle against the firm. Or more romantically, the possibility that by writing, imagining, and working together, Amazon workers might produce a vision for the world after Amazon.

To be clear, we are not suggesting that the writing workshop is a kind of psychoanalytic therapy wherein the now collective subject, through the "talking cure," reveals the unconscious trauma at the core of their misery. We are also cautious about roman-

ticising workers' knowledge and perspectives. A century of research on class and ideology is categorical: all social subjects, regardless of their class, are shaped by the contradictions of capitalism and we should expect contradictions, ambivalences and dissonance from every imagination (Eagleton 2007). But we are suggesting, in a long lineage of worker-focused theory and practice, that the view from the proverbial "shop floor" matters. This is especially true when that view is articulated in groups of workers talking about and reflecting on the nuances of their shared condition and explicitly linking this to structural, systemic, and historical social forces. One of the conjectures that animates our project is that the act of writing fiction might be uniquely useful in allowing access to this knowledge.

For rank-and-file Amazon workers, this knowledge may be borne largely in the body, a body that has been drilled, disciplined and surveilled to work at the rhythm of robots and protocols that are themselves calibrated centrally by algorithms and senior managers at Amazon's corporate headquarters. What does the embodied imagination of the Amazon worker know that eludes or exceeds the imagination of even those of us who are paid to study the company from afar? How might workers be supported to consciously grasp and share these insights? Perhaps these insights will not simply express themselves in terms of facts and figures, descriptions of protocols and theories of exploitation. Perhaps they will also express themselves in terms of affects and relationships, feelings and conjectures, hopes and fears, and a sense of purpose or purposelessness. Fiction, and especially fiction writing is a phenomenal medium for coming to terms with these ineffable and ambivalent forms of knowledge (Steven 2023).

The use of the written word to inspire or instigate class struggle predates capitalism, and is the subject of a great deal of scholarly inquiry, predominantly but not exclusively in the field of critical literary studies (Williams 2022; Steven 2023). Less well established is the role of SF fiction, which often has an ambivalent relation to class struggle. In many of its earliest depictions, proletarian masses and bodies were presented as threats to the dominant order or monstrous manifestations of its cruelties, but rarely with much real agency (see Mazierska and Suppia 2016). Since that time, in both popular and alternative texts, working class struggles have been more capaciously and sympathetically represented, and scholars have argued that such representations indeed matter politically in various ways.

What has not been investigated at all (so far as we know) is the potential for the writing of science fiction to supplement working-class struggles. There is a long history of workers and their allies supporting one another to write about their experiences of exploitation or of life in general (Woodin 2018). Such a practice can be traced to the nineteenth-century when workers' clubs and associations promoted literacy and the writing of narrative and poetry not only to share information and analysis but also to dignify and enrich the life of the worker (Hoggart 1998). This became even more prevalent with the advent of cheaper media of print communication, leading to, for example, a thriving culture of independent pamphlets and other self-published platforms in the 1970s and 80s (Woodin 2018). Our project takes particular inspiration from the Workers Writers School, an ongoing initiative that carries forward this tradition today, offering regular free workshops to working people in the New York area with a special focus on poetry (Hsu 2017; Nowak 2012).

These efforts to support working people's creative writing can be fruitfully placed beside a long tradition of workers' inquiry or militant inquiry, in which radical organisers and activists create situations and structures to encourage workers to reflect on and study their own objective conditions of exploitation (see Woodcock 2014). Many work-

ing in this tradition take inspiration from Marx and Engels' early attempts to send surveys to workers in France to obtain, from the shop floor, a sense of the way the labour process was changing and the new axes of struggle (see Haider and Mohandesi 2013). This method was most fully realised in the Workerist turn in Italian militant working class organising in the 1960s and 70s (Woodcock 2014). Faced with the growing complacency of traditional trade unions and with a new wave of industrialisation and labour migration, organisers sought to form study groups and other forms of collective inquiry with increasingly dissatisfied workers. These approaches emerged concurrently with a theory of the composition and decomposition of both labour and capital, which focused on the way capitalism's constant crises and reconfigurations arrived as a response to workers' protagonism and resistance (see Ovetz 2020). Further, these methodologies sought to capture the emergence of new subjectivities that were otherwise not heard or seen by either consumer capitalism or traditional workers' organisations.

6. Learning from the Project

In the Worker as Futurist project, we have posed the question: what role might creative writing, in particular SF, play in renewing and expanding the tactics and ambit of workers'/militant inquiry? Traditionally, the approach has focused on non-fiction and testimonial forms that efficiently and directly reveal the conditions of the workplace. This is important. But more generally speaking, workers' inquiry seeks to uncover two other key insights that SF writing may help render transparent.

First, workers' inquiry has always dedicated itself to trying to understand the immanent tendencies and contradictions that emerge from the changing conflict of capital and labour and that might, therefore, set the stage for movements, struggles, and uprisings yet to come. It is, in a sense, an inherently speculative pursuit, even when it is dedicated to understanding the here and now of shop floor conflict. It aims to give workers and organisers a set of insights that help them anticipate, plan, and organise based on the way present-day tensions might yet manifest as collective action.

In the Worker as Futurist project, many of the worker-writers responded to the prompt on "the world after Amazon" by asking questions about the future axes of struggle. One wrote about the possibility of solidarity and even love between human workers and robots. Another focused on the nightmare scenario in which Amazon takes over the private prison industry. These future projections are more than fantasy: they represent the application of an analysis of contradictions in the present to a vision of the future with strategic implications.

Second, given that workers' inquiry is dedicated to understanding the changing nature of subjectivity, then writing, and in particular SF writing, may be an exceptional approach. There is a massive corpus of high-level debates in literary studies, including among Marxist literary critics, on how the process of both reading and writing is reflexive and transformative for the subject (see Horowitz 2023, for example). That literature is too abundant to gloss over, but suffice to say that it is not simply that writing makes a subject transparent to itself or its readers. Rather, writing is also a process of subjective transformation, and one that, in spite of the fact it is usually a solitary activity, still one that is intersubjective: the writer (even the private diarist) always anticipates a reader or readers. As such, we should see creative writing as a portable laboratory for exploring and refusing the process of capitalism's subjectivation.

When workers write, and especially when they write supported by a structure or framework that encourages sharing and reflexivity, they (we all) transform. That transformation is, necessarily, prompted by lived, embodied conditions of capitalist exploi-

tation. However, it also always exceeds it. If we are interested in learning how capitalism shapes the subjectivity of workers and how workers are, in their individual and collective bodies, resisting and refusing that subjectivation and exploring new, rebellious modes of subjecthood, we should not only pay attention to but also foster creative, speculative writing.

In the Worker as Futurist Project, we often observed workers writing about how the struggle within or against "the world after Amazon" creates conditions of subjective transformation. One story follows a maid in a gated community as she transitions from a lonely, fear-filled existence to one of rebellious solidarity and shared kinship with other workers. Several other writers explored using experimental or multiple voices in their stories, which on some level represents the authors' own experiments with subjective form. In our future work we hope to use the tools of literary analysis to understand more about the subjectivities revealed through their work, and if and when they are resistant to Amazon's capitalist mode of domination. Regardless, we are convinced they are important.

Third, writing dignifies us, and having that writing published even in a minor way doubles the effect. Typical and traditional labour organising that exclusively focuses on bread-and-butter issues is vitally important, but it rarely takes seriously the role of dignity in struggle. Victories certainly afford workers a sense of dignity—"we fought and we won!" But in a reality where defeat is common, we can be more intentional. A sense of dignity—that one's voice and existence matter in the world, is undeniably a huge motivator for any struggle. Indeed, successful social movements throughout history have made affording the oppressed a sense of dignity a priority. Under an older moment of Marxist-inspired organising, the working class was dignified as, to borrow Benjamin's (1969) poetic and secularised religious terms, "the last oppressed class," destined to redeem history itself and, because of their unique role as capitalism's gravediggers, imbued with a "messianic power." Today, very few Marxists and working-class organisers can tolerate, let alone believe in, such prophecies—for better or for worse (see Dean 2012). In the absence of such triumphant narratives based on a so-called "science of history," it becomes more important to take tactics of dignification seriously.

In our individualist, capitalist society, where the author and the artist are held up (wrongly) as the icons of unalienated labour and creative freedom, we should not underestimate how dignified people and workers become by being recognized as writers. This of course can become toxic when it is only associated with the cult of bourgeois genius, as a triumph of the individual (see Haiven 2018). But when achieved as part of a collective writing project, such as the Worker as Futurist experiment, we suggest it can be transformative. Dignity here stems from the simple recognition that a worker deserves to imagine the future, not simply be a pawn or a drone in someone else's future-making. None of the writers we work with are under any illusion that their writing will change the world in a large way, or that their stories can rival the story Amazon is telling about itself. But they take courage and inspiration from the fact that their imaginations matter: they tell their side of the story. This sense of mattering, and of mattering to one another, cannot help but conflict with the everyday experience of the vast majority of workers at Amazon and other platform capitalist companies, where the workers' bodies and minds are relentlessly exploited and their imaginations do not matter, and within a broader narrative that implies or explicitly states that this condition is the unquestionable future. Dignity here is a vital condition in the infrastructure of resistance.

In many of the stories written as part of the Worker as Futurist project, workers are able to band together and rise up (or simply survive post-apocalyptic scenarios) because they are able to move from an undignified space of drudgery and servitude to a set of relations with others that afford them a sense of dignity and purpose. Importantly, in most cases, these characters are not dignified by some authoritative power structure but by other workers or generally powerless people.

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3. Domination in Digital Capitalism

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Digital Commons for the Ecological Transition: Ethics, Praxis and Policies

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Abstract: The article seeks to understand how the digital commons movement addresses ecological issues, how its actors incorporate them into their ethics and praxis, and the challenges they face in scaling up to become a viable ecological alternative to digital capitalism. Building on three case studies, we show that the digital commons currently face three major limitations: reliance on unsustainable Big Tech products, inability or unwillingness to scale up, and negligible political support. Based on two Policy Labs we conducted with actors of the digital commons movement, we conclude by outlining proposals to overcome these limits by adopting E.O. Wright's anti-capitalist strategies framework.

Keywords: digital commons, ecological transition, technological sobriety, anti-capitalist strategies

1. Introduction

A core belief of the digital commons movement has long been that technological innovation is key to human progress. Digital commons are shared digital resources that contributors co-produce by establishing their own governance rules. Starting in the 1990s, massively distributed online communities formed to develop free software projects (e.g., Linux), collaborative databases (e.g., OpenStreetMaps), and shared knowledge resources (e.g., Wikipedia). These communities believed that digital technologies – provided they were liberated from the enclosures of intellectual property – would make the world a better place. Knowledge would be made accessible to the many; collaborations would be enabled worldwide; meaningful social relations outside the realm of the market would blossom. Whilst these promises were championed by prominent liberal scholars such as Lawrence Lessig (2001, 2004) and Yochai Benkler (2006), they also served to reinvigorate the Marxist dream of an exit from capitalism made inevitable, or at least plausible, by the development of technical productive forces (Gorz 2008).

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This narrative of abundance deserves further scrutiny, and not just because of its utopian sociotechnical overtones. Are constant economic growth and technological innovation truly the best way to tackle the global climate and ecological crises? And should digital technology not be put to work in a more localized and simple manner, oriented towards "degrowth" for example? Indeed, while digital information has specific properties that distinguish it from rivalrous resources such as land or material goods, it is equally important to recognise that the flourishing of the digital is not free of material limits. Digital technologies, whether open source or proprietary, consume non-renewable resources, depend on rare earth minerals, require energy, and emit CO2. Environmental sustainability and climate warming mitigation thus concern both digital capitalism and the digital commons. Silicon Valley seems ill-suited to deliver the urgently needed ecological transition. As even the *Financial Times* recently admitted, "capitalism won't deliver the energy transition fast enough... There's too much to do, and given the urgency and the need to get the solution right, this isn't a task for your favourite ESG-focused portfolio manager or the tech bros" (Brower, 2023). Can the digital commons do better?

Some activists within the digital commons movement believe the ecological transition can only be achieved by reducing the use of digital technologies while simultaneously incorporating these technologies into a mode of production distinct from digital capitalism (Fuchs, 2022). In the past ten years, a number of these activists have attempted to introduce environmental concerns into the digital commons movement and to place the digital commons at the service of the ecological transition. Three main strategies for greening the digital commons have been adopted so far: the use of free and open source software to make digital devices and services sustainable (e.g., Fairphone[1]), the creation of platform cooperatives to improve the sustainability of the sharing economy (e.g., Fairbnb[2]), and open hardware manufacturing initiatives in distributed workshops that are guided by circular economy and/or degrowth principles (e.g., makerspaces). By and large, these approaches seem to converge on a type of "digital sobriety" that we define as the practices aiming to reduce the production and use of digital technologies, while maximising their efficiency and recycling capacity, to mitigate their material and energy footprints. To be consistent with an emancipatory perspective, digital sobriety, as we defined it, requires two conditions. On the one hand, it calls for an objective assessment of the environmental impact of digital technologies (Pasek, Vaughan and Starosielski 2023). On the other hand, digital sobriety requires a democratic debate about the societal needs that these technologies are intended to meet, favouring "an 'ecology of demand' (degrowth), rather than an 'ecology of supply' (green growth)" (Bihouix 2021, 96).

Nevertheless, these initiatives face daunting questions: is their aim of scaling up to supersede digital capitalism compatible with the digitally sober curtailing of their ecological impact? Can they resist the technological *hubris* that permeates digital capitalism without becoming socially insignificant, confined to a niche for the happy few? Can they develop political alliances powerful enough to compete with Big Tech's extensive lobbying and collusion with governments?

To address these questions, we draw on Erik Olin Wright's (2010, 2019) real utopias and anti-capitalist strategies conceptual framework. Digital commons can be described as "real utopias" that prefigure here and now as a non-capitalist organisation of society (Broca 2013; Sutterlütti and Meretz 2023; Wright 2010). For Wright, real

[1] See: https://www.fairphone.com/en, accessed on 06 March 2024
[2] See: https://fairbnb.coop, accessed on 06 March 2024

utopias' moral desirability must be accompanied by concrete long-term viability and achievability, within current sociopolitical conditions, e.g., the strategies and the means of social movements which support them (Wright 2010). Thus, our article seeks to investigate whether the digital commons are ecologically viable, and what political strategies are being deployed to support their transformative potential.

We employ two research strategies - ethnography and Policy Lab development (Hinrichs-Krapels et al. 2020) - and focus on the case of France. The French digital commons movement is one of the most advanced in both ecological and strategic terms (O'Neil et al. 2021). We selected one paradigmatic case (Flyvbjerg 2006) for each approach to greening digital commons: Framasoft[3] (free software for ecologically sustainable digital services), Mobicoop[4] (a platform coop for sustainable sharing), and Precious Plastic[5] (open hardware for distributed manufacturing). We conducted a one-year ethnographic survey of each case - between April 2019 and June 2020 for Framasoft,[6] and between June 2022 and June 2023 for the two other case studies - consisting of semi-structured one-hour interviews with the leaders and active members of these organisations (N=9, N=18, N=4 respectively). We then analysed this corpus through applied thematic analysis (Guest et al. 2011).

Next, we examined the anti-capitalist strategies of the French digital commons movement in the context of the ecological transition, and elaborated proposals to enhance them. To avoid any form of idealism, we developed proposals based on this movement's praxis. In line with our participation in the Digital Commons Policy Council,[7] the "digital commons" working group at the Centre Internet et Société research centre[8] and the Société des Communs association,[9] we conducted an exploratory construction of digital commons movement strategies. We organized two one-day Policy Labs on September 24, 2022, at the Town Hall of the 10th arrondissement of Paris, and on November 25, 2022, at the Centre Internet et Société. One hundred (respectively N=28 and N=78) activists, digital commoners, researchers, elected representatives and public officials took part in the Policy labs, including Michel Bauwens, Vasilis Kostakis, the Executive Director of Wikimedia France, the elected official of the 10th arrondissement of Paris in charge of digital issues, and the personal assistant of the French "Digital Ambassador". In the morning, three to five participants showcased current strategies and public policies. In the afternoon, focus groups of 6 to 8 participants refined and complemented these proposals by connecting them to their own practices. After analysis and review, we presented these proposals at various academic (e.g., IAMCR23), activist (e.g., PublicSpaces Conference 2023 for a Collective Internet[10]), and institutional (e.g., Numérique en commun(s) 2022) events. One medium-term outcome of these policy labs has been the establishment of a "French digital commons coalition," comprising representatives from about fifteen digital commons organizations

[3] See: https://framasoft.org/, accessed on 06 March 2024
[4] See: https://mobicoop.fr/, accessed on 06 March 2024
[5] See: https://www.preciousplastic.com/, accessed on 06 March 2024. Although Precious Plastic is a Dutch initiative, the Head of Innovation is French, and its French community is among the most actives.
[6] The Framasoft ethnography was conducted as part of the research project There Are Platforms As Alternatives (TAPAS) by one of the authors.
[7] See: https://dcpc.info/, accessed on 06 March 2024
[8] See: https://cis.cnrs.fr/en/politics-of-digital-commons/, accessed on 06 March 2024
[9] See: https://societedescommuns.com, accessed on 06 March 2024
[10] See: https://conference.publicspaces.net/en/session/vragen-uit-de-samenleving, accessed on 06 March 2024

(such as Wikimedia France, Framasoft, etc.). Currently, it aims to engage in advocacy efforts and contribute to the public discourse through the publication of op-eds[11]. We are in the process of organizing a third Policy Lab, scheduled for the end of May 2024, with this coalition aimed at engaging more directly with the practical questions regarding how public administrations could support digital commons. This article represents a continuation of this iterative approach and we hope it will stimulate further discussion.

We begin by summarising the digital commons literature to show how ecological issues, whilst initially overlooked, have become an object of growing concern, though they are still seldom studied (section 2). We then present our ethnographies of the three selected case studies and analyse their ecological viability and feasibility. We find that these initiatives face three major limitations: reliance on unsustainable "Big Tech" products, inability or unwillingness to scale up, and negligible political support (section 3). Finally, we present the results of our two Policy lab workshops and outline proposals to overcome these limits, using E.O. Wright's (2010, 2019) anti-capitalist strategies framework (section 4).

2. Ecological Issues in Digital Commons Discourses

Though ideologically and politically diverse, most early advocates considered digital commons as abundant and decoupled from material limitations. It is only in the past decade that commoners have attempted to incorporate ecological concerns into their practice and ethics.

2.1. Early Omission - Digital Commons Against Informational Capitalism: Stallman, Lessig, Benkler (1985-2000)

In the wake of Richard Stallman's (1985) formal definition of the moral imperative to freely share software, digital commons promoters - whether Marxist or liberal, scholars or activists - agreed that digital technologies enabled a world where information is abundant. This often involved separating the material and the digital world. Liberal scholars thus highlighted how information's non-rival status overcame scarcity (Lessig, 2001; Benkler, 2006). They shared with Silicon Valley libertarian "evangelists" such as John Perry Barlow, Nicholas Negroponte, and Kevin Kelly the belief that digital technologies would transcend material limits to economic growth, or at least to the growth of information flows around the globe (Barlow 1996; Kelly 1998).

The material/digital separation was imbued with a strategic purpose: digital commons activists argued that "the system of control that we erect for rivalrous resources (land, cars, computers) is not necessarily appropriate for non-rivalrous resources (ideas, music, expression)" (Lessig 2001 p. 95). In other words, it is impossible to "steal" a non-rivalrous resource because no one is ever deprived of it. The extension of patentability and the strengthening of copyright were absurd measures, ill-suited to the nature of these resources. While the argument had persuasive force, it obscured the material conditions that make information exchanges possible. This early digital commons movement shared with tech-industrialists and the "Californian ideologues" of digital capitalism (Barbrook and Cameron, 1996) a denial of the negative environmental consequences of technological development (Turner 2013).

[11] See: https://www.euractiv.com/section/digital/news/eu-task-force-calls-for-digital-commons-foundation-launch/, accessed on 06 March 2024

2.2. Digital Commons as a Productive Force which Transcends Capitalism: Hardt, Negri, Gorz (2000-2010)

In the 2000s, some Marxist theorists, many within the realm of "Italian Theory", espoused the belief that a world of digital abundance was imminent. Contrary to the liberal view, they believed this abundance was eroding the capitalist valuation process and its reliance on (artificial) scarcity. The commons were thus integrated into a post-capitalist narrative (Hardt and Negri 2004). As Michael Hardt put it, "through the increasing centrality of the common in capitalist production - the production of ideas, affects, social relations, and forms of life - are emerging the conditions and weapons for a communist project. Capital, in other words, is creating its own grave-diggers" (2010, 355). For Nick Dyer-Witheford, "If the cell form of capitalism is the commodity, the cellular [seed] form of a society beyond capital is the common. A commodity is a good produced for sale, a common is a good produced, or conserved, to be shared' (2007, 82). German activists in the Oekonux ("Linux Oekonomy") network similarly believed that the digital commons could not be entirely absorbed by capital and that, at some point, the new logic would supersede the old (Meretz 2013).

The conflict between digital commons and intellectual property was thus recast as a conflict between harbingers of a post-capitalist future and elites desperately trying to save capitalism from its terminal crisis (Broca and O'Neil 2021). French philosopher André Gorz, at the time heavily influenced by the Italian Autonomist tradition, presented free software hackers as embodying "a practical negation of capitalist social relations" (Gorz 2003, 93). He argued that "knowledge and information are, in essence, common goods, belonging to everyone, and therefore cannot become private, commodified property without being mutilated in their usefulness" (Gorz 2008, 19). Thus, the "immaterial" nature of work and digital abundance did not fit into the institutional logic of waged labour and intellectual property rights.

2.3. Exploratory Studies of the Digital Commons Ecologisation (since 2010): Bauwens, Kostakis

Since the 2010s, a growing number of associations and public organisations have raised concerns about the ecological impacts of the digital economy. The main criticisms have been mainly directed towards Big Tech firms, but many of them are also applicable to digital commons. Two responses have been put forward: (a) greenIT, reducing the negative ecological impact of the production, use, and recycling of digital technologies; (b) IT for green, increasing the positive ecological impacts of digital technologies in other sectors, such as agriculture or material manufacturing (Faucheux and Nicolaï, 2011).

It is primarily this second perspective that has been explored by digital commons theorists such as Michel Bauwens and Vasilis Kostakis. They view digital commons as progressive alternatives that foreshadow an ecological and post-capitalist future, centred around self-management and the collective ownership of the means of production (Bauwens et al. 2019). From approximately 2010, Bauwens started to incorporate environmental considerations in his writings. With Vasilis Kostakis, he developed the concept of "cosmolocalism", which refers to the local manufacturing of goods based on globally shared common resources such as modelling software, plans, and wikis (Schismenos et al. 2020). Cosmolocal production in fablabs and makerspaces contributes to the ecological transition in three ways: promoting design-embedded sustainability, enabling on-demand production, and encouraging sharing practices (Kostakis et al. 2018).

While Bauwens and Kostakis, along with other researchers, have conducted case studies to explore the ecological benefits of cosmolocalism (Cindy 2016; Kohtala 2015; Rumpala 2019), few studies have interrogated the conditions for scaling up this mode of production.

3. The Ecological Ethics and Praxis of Digital Commons

Digital commons projects enact three contributions to the ecological transition. The first focuses on extending the lifespan and sustainability of information technologies. The second engages in the sharing economy to safeguard the ecologically beneficial effects of resource pooling, shifting them away from a productivity-driven logic. The third contribution aims to relocalise manufacturing by sharing plans and designs online, which are then used for local workshop production.

This development of what can be called "digital commons-based ecological production" would enable the spread of digital sobriety. In line with Wright's (2010) definition of real utopias, we investigate whether these initiatives are ecologically sustainable by examining three paradigmatic case studies of each contribution (Table 1.). In each case, we focus on the ethics, praxis, and limitations of the initiative.

Digital commons contribution to the ecological transition	Case study
Free software for ICT sustainability	Framasoft
Platform coop engaged in the sharing economy	Mobicoop
Distributed manufacturing based on open hardware	Precious Plastic

Table 1: Selected case studies

3.1. Free Software for ICT Sustainability: Framasoft

3.1.1. Framasoft's Promise and Practice

Framasoft is a French non-profit association which was originally created to defend the use of free software, particularly in the field of education (Gosset 2021). Since 2014, it has made alternative Web services available to the public, which aim to respect the freedoms of users. The most popular are Framaforms (questionnaires), Framapad (collaborative writing) and Framadate (polling). These services were used in 2022 by several hundred thousand people, making Framasoft one of the largest online service providers in France, and even in the world - if we exclude Big Tech products. The association advocates for a decentralised Internet as a response to the domination of the GAFAM (Google, Amazon, Facebook, Apple, Microsoft). Framasoft has accordingly established a network of alternative service hosts: the Collectif des Hébergeurs Alternatifs, Transparents, Ouverts, Neutres et Solidaires or CHATONS ("KITTENS").[12]

Framasoft advocates a reasoned use of digital technology. It considers that the future, that the capitalism of surveillance paints today, is neither attractive nor viable. It considers humans and the planet as resources, and leads straight to their destruction (Gosset 2021). Framasoft wants to bring into being "another world, where digital technology is a controlled, transparent and user-friendly tool that contributes to emancipation" (*Ibid*. p 58). Although the association has integrated digital sobriety into its

[12] "Collective of alternative, transparent, open, neutral and supportive hosting providers". See: https://www.chatons.org/, accessed on 06 March 2024

advocacy, it is difficult to measure Framasoft's precise ecological impact. Framasoft's services bear some resemblance to the "low-tech" movement (Mateus and Roussilhe 2023). They are relatively "light", as they do not involve advertising, and minimise the harvesting of personal data. Moreover, they are hosted by Hetzner, a data centre operator which mainly uses renewable energy.

3.1.2. Framasoft's Limits

Framasoft's services are widely adopted, but there are limitations. Can an association comprising ten full-time employees truly compete with Big Tech? Framasoft addresses scaling via a process defined as "archipellisation": thanks to the decentralised emergence of other similar service providers, digital alternatives will gain visibility and popularity, while avoiding the problems created by centralisation. This perspective on establishing horizontal alliances among independent organizations aligns with the "scaling small" concept developed by Adema and Moore (2021). In practice, an entity comparable to Framasoft in terms of renown and number of users has yet to emerge. Further, hundreds of decentralised providers would be needed to meaningfully compete with Big Tech. Clearly "archipellisation" as it currently stands does not represent a viable alternative to digital capitalism.

A related limitation is the scarce support the association receives from public authorities. Framasoft has chosen to depend exclusively on donations (98% of its revenue), with 86% of these funds coming from individual donations. There is a case to be made that the association should be supported by the state, insofar as it seeks to advance the general or public interest. However, this would require bridging the significant cultural and ideological divide which separates it from public actors. In France the road will be a long one, given political elites are still fascinated by Silicon Valley and the start-up model (Lacorne 2019). The same could be said of elites elsewhere, such as the UK's current "tech bro" Prime Minister, Rishi Sunak (Ashcroft 2020).

3.2. Platform Coops Engaged in the Sharing Economy: Mobicoop

3.2.1. Mobicoop's Promise and Practice

Mobicoop is a cooperative whose carpooling platform was developed under an open-source license. The project emerged in 2009 as a response to the creation of a capitalist platform that would later become Blablacar, which now dominates the carpooling market across Europe. The founders of Mobicoop sought to create this alternative for two reasons. First, Blablacar transformed carpooling practices, which were previously based on the gift economy and the solidarity economy, into a commodified system enabling it to levy commissions. Second, Blablacar, whose valuation now exceeds €1 billion, effectively limits the environmental benefits of carpooling: the need to satisfy investors led the platform to launch advertising and incentivising campaigns aimed at boosting the number of carpoolers. Whilst this might appear beneficial, since pollution from individual cars is reduced, it may generate adverse effects by encouraging drivers to use cars in situations where they may otherwise have opted for more eco-friendly options including bicycles, trains, or other forms of public transport.

Mobicoop promises to be a carpooling platform serving the ecological transition and the solidarity economy. To this end, Mobicoop does not charge commissions on transactions made on its platform, develops the software under an open-source license, and operates as a multi-stakeholder cooperative. Its objective is to encourage low-carbon transportation entities, such as local authorities and train companies, to cooperate to

avoid competition and reduce reliance on individual cars (Interview with Mobicoop founder, 01/09/2022).

Currently, the Mobicoop cooperative has 1,100 members, and its platform is used by 500,000 registered drivers and passengers. Its business model relies on selling advice and services, such as customizing the platform, to firms and local authorities, enabling them to offer a free service to carpoolers. Mobicoop particularly focuses on "short-distance" carpooling trips (home-to-work) to establish its presence in different regions.

3.2.2. Mobicoop's Limits

Mobicoop's economic development and ability to garner political support are limited. In economic terms, several factors reduce the cooperative's ability to achieve substantial growth. Raising funds is challenging for a solidarity economy cooperative when financial investors seek rapid, double-digit returns on investment. This limits Mobicoop's capacity to invest in research and development (to enhance software efficiency), design (to improve user experience), and communication (to attract new users). In contrast, Blablacar quickly raised significant amounts of capital before going public. This enabled buying out competitors, making massive investments to improve the platform, and offering a service whose commission rates were initially low, leading to Blablacar's dominant position. In the carpooling platform market, network effects – whereby mover providers of a good or service accrue ever more users, increasing their value and visibility and new users' motivation to join (Shapiro and Varian 1999) – act as a barrier for new entrants and creates lock-in effects for users. Moreover, Blablacar has countered Mobicoop's ecological criticism, at least rhetorically, and increasingly emphasizes the CO2-saving benefits of its activity to its customers, investors, and government authorities.

Mobicoop has also struggled to secure financial support from political actors. Initially, the multi-stakeholder cooperative aimed to enrol local communities as members. However, such public-commons partnerships are less institutionalized than public-private partnerships, and many public actors are unaware of the cooperative, or reluctant to invest in its capital. As reported by the cooperative's president, this has led to challenges in obtaining public funding, and Mobicoop's financing options from political sources remain limited:

> "We would all like to say that, that's why we created the cooperative, and we will continue to fight for it, but today it is not happening, local authorities are not part of the capital of Mobicoop, or only at a small scale (…) They know how to subsidise an association, they know how to create a semi-public company, yes, they have texts, legal paragraphs, supporting texts, they know how to account for it. But how do they account for their shares in Mobicoop? They don't know how to do it" (Interview with a Mobicoop founder, 01/09/2022)

Furthermore, national public investors such as the Banque Publique d'Investissement (BPI) are more inclined to finance tech start-ups rather than tech cooperatives that develop digital commons. In 2017, Blablacar completed a €100 million funding round in which the Société nationale des chemins de fer français (SNCF) participated for an undisclosed amount. Finally, the legislative framework established in the past decade to regulate the carpooling market in France heavily favours Blablacar. This can be attributed to the significant resources mobilized by Blablacar to conduct lobbying campaigns when the 2017 and 2022 laws regulating transport were created. Another factor

is the preference of political actors for capitalist platforms. As an illustration, the Uber files - a leaked database of Uber's activities in about 40 countries from 2013 to 2017 - revealed the favourable treatment granted by the French government to capitalist platforms such as Uber, resulting in Uber's dominant position in the French carpool platform market (Henley and Davies 2022).

3.3. Distributed Manufacturing Based on Open Hardware: Precious Plastic

3.3.1. Precious Plastic's Promise and Practice

Precious Plastic is a project aiming to recycle plastic waste through a distributed manufacturing approach. Launched in 2013 by an industrial design student, the project develops machine blueprints for plastic recycling and 3D printing designs for various objects (such as jewellery, furniture, construction modules, etc.) produced using these machines and recycled plastic. By releasing these plans and designs under an open-source license, the project intends to address the plastic pollution challenge in a decentralized and grassroots manner. Licenses impose no usage restrictions, allowing any organisation to utilize these digital commons for commercial or non-commercial purposes. This initiative aligns with the open hardware movement, which applies the ethical principles of open source to material manufacturing (Daly 2016).

The coordinating association has a team of six employees funded by donations and a community of a few hundred engineers and designers actively developing new machine versions (version 5 is set to be released in 2023). The development of these plans involves both community-driven and centralized efforts. While contributors propose innovations or provide feedback on online forums, the core project team provides overall guidance and makes technical decisions. The primary objective thus far has been to ensure that the machines are easy to replicate, manufacture, and repair locally. The production of the machines and objects is carried out by individuals or organisations in a decentralized manner. There is a network of around 1,000 workshops spread across 107 countries that manufacture recycling machines and products made with recycled plastic. According to a survey conducted in 2022, these workshops are supported by 11,000 volunteers, employ 6,441 people, and generate a revenue of $36 million. They have contributed to recycling nearly 600,000 tons of plastic.[13]

3.3.2. Precious Plastic's Limits

The founders and current directors of the project are committed to scaling up. In their 2023 evaluation report, they explicitly emphasized "the crucial aspect of impact".[14] The data reveals a growing number of organisations joining the project annually, from around ten in 2014 to approximately a hundred in 2022, along with a corresponding increase in the volume of recycled plastic. Nevertheless, our interviews revealed three key limitations. First, while the recycling machines were designed to be fabricated autonomously, some components are produced industrially. Most workshops source these parts from Chinese suppliers, resulting in an escalation in the ecological cost of machine production.

Second, some association members sought to expand the project's financial autonomy beyond its reliance on donations. They launched a commercial venture aimed

[13] By way of comparison, plastic waste represented 2 million tons in 1950 and 380 million tons in 2015, of which 15% is now collected and recycled. Source: https://ourworldindata.org/plastic-pollution, accessed on 06 March 2024

[14] See: https://preciousplastic.com/impact/2023.html, accessed on 06 March 2024

at manufacturing plastic recycling machines for global brands (e.g., Adidas, Ikea, Google) and international organisations (e.g., UNICEF). Although this initiative generated revenue for this team, it fell short of financing other participants, notably those involved in research and development. Consequently, some members chose to leave the association to launch a private plastic recycling company, while the association continues to rely on donations.

Third, the project faces what one association manager referred to as the "tragedy of the digital commons". The machine blueprints are made available online, accompanied by tutorials and how-tos, under open-source licenses. This openness allows individuals and non-profit organisations to access and utilize the plans; it also extends to private companies. As its former Head of Innovation pointed out, "people don't share, either due to lack of time or the usual fear of protecting their development" (Interview, 07/07/2023). Commercial entities such as the Austrian firm Plasticpreneur capitalised on Precious Plastic's open-source plans, creating improvements without reciprocating by sharing their enhancements with the broader community. The under-contribution issue is pervasive within the realm of open-source software and licensing, including in the 3D printing world (Moilanen et al. 2015). Although reciprocity licenses have been proposed as potential solutions, obligating users to contribute back (see section 4.2 below), the leadership of Precious Plastic rejects such licenses to remain aligned with the fundamental principles of open source and to maximize the dissemination of information.

3.4. Summing Up: Three Challenges Faced by Digital Commons

The claim that the digital commons represent a sustainable alternative to digital capitalism must contend with several interconnected challenges. Digital commons do not fully engage in environmentally sustainable practices and technologies. In a kind of mirror image of for-profit digital platforms' reliance on infrastructure produced by digital commoners (e.g., FLOSS), the ecological production of activist digital commons projects partly relies on unsustainable Big Tech products such as Apple laptops and phones, or 3D printers and parts produced in China (Precious Plastic).

Digital commons projects also struggle to scale up. Some refuse to expand because of their ideological principles favouring degrowth and decentralisation (Framasoft), while others find it challenging to compete with economic rivals (Mobicoop, Precious Plastic). We have observed that digital economy socio-technical dynamics (e.g., network effects), funding models (e.g., venture capital, public subsidies), and legislative frameworks largely favour digital capitalist firms. Moreover, these firms, which have attempted to neutralize critiques of their ecological impacts, "free-ride" by using digital commons without contributing anything in return, while still maintaining a hyper-productivist and unsustainable accumulation regime (e.g. Plasticpreneur).

Finally, political support for digital commons is negligible. This may be due to the ideological focus of some digital commons actors on maintaining local control at a manageable scale, which hinders comprehensive engagement with state entities (e.g., Framasoft). Additionally, the lobbying resources mobilized by capitalist firms far outweigh those of the digital commons movement, and class homologies facilitate connections between political and economic elites, which are fascinated by the Silicon Valley start-up model from which they derive symbolic and economic benefits (Halpin and Nownes 2021).

In brief, projects mostly remain "niche" alternatives which do not scale up and in some cases rely on unsustainable products: they do not yet constitute a credible alternative to the proprietary and unsustainable products and services of digital capitalism.

4. Anti-Capitalist Strategies of the Digital Commons Movement in the Context of the Ecological Transition

In light of this situation, what can be done? In France, the digital commons movement is trying to address these limitations. Mobicoop's Director is leading a coalition of co-operatives seeking to raise a billion Euros to finance social businesses engaged in the ecological and post-capitalist transformation of the economy. Together with other digital commons movement entities such as Wikimedia France, Framasoft's Director is attempting to secure funding for a full-time "spokesperson" who could represent the movement's interests when dealing with public authorities. In addition to these initiatives, what are the systemic strategies which could support the digital commons movement's ambition to institute an ecologically viable and economically feasible alternative to digital capitalism?

As described in our introduction, we held two one-day Policy Lab workshops in 2022 to identify and refine existing strategies, which brought together activists, digital commoners, researchers, elected representatives and public officials. We structure the resulting strategic proposals according to the anti-capitalist strategies framework developed by Wright (2019). By combining what Wright defines as symbiotic ("from above") and interstitial ("from below") strategies to neutralize capitalist influence on the one hand, with the imperative that the digital commons must be greened on the other, we arrive at four strategies for the digital commons movement:

1. Escaping digital capitalism by experimenting with ecologically viable praxis in digital commons "real utopias";
2. Resisting digital capitalism by safeguarding against its harmful environmental effects and its exploitation of common resources;
3. Reducing the territory of digital capitalism by lobbying public authorities to establish an institutional framework that supports green digital commons real utopias;
4. Domesticating digital capitalism by lobbying public authorities to enact laws and policies that limit its expansion.

Whilst some of these options are already being implemented by some sectors of the digital commons movement, it is conceptually and practically useful to formally outline them. We are conscious of these proposals' summary nature; they should be understood foremost as a platform for discussion.

4.1. Escaping Digital Capitalism: Towards More Ecologically Sober Digital Commons

Wright's (2019) theoretical framework posits that real utopias developing alternatives to capitalism must be viable in the long term. In the present case, this means that digital commons must support the ecological transition of our modes of production and consumption.

Happily, digital commons are inherently more "technologically sober" than capitalist alternatives. This is because the shape of these resources is directed by the requirements of the producing community: the objectives and outcomes of a project primarily reflect the demands of their initial contributors, who are also its prime beneficiaries. On the one hand, this means resources are not always, in the first instance, "user-friendly", so they may be reserved for a technically proficient minority. On the other hand, this integrity of product and process results in exceptional technological robustness and sobriety, since only necessary components are included (DCPC, 2022).

This digital sobriety praxis is at work in the collectives we have studied. It is also exemplified by projects such as Fairphone, which aims to create smartphones using

materials from “ethical” mines and to combat obsolescence by extending software use for smartphones from the current 2-year-average to 8 years. Nonetheless, our case studies showed the limitations of digital commons’ ecological viability: many remain dependent on Big Tech products, whose data production and consumption are far from “sober”, and in some cases on significant material and energy resources. As Fairphone’s Head of Software Sustainability put it during one of our 2022 Policy Labs: “Even though we’re getting better every year, more than 60% of the material we use in Fairphones still comes from mines that we don’t consider ethical... That is the reason why a lot of our employees have no Fairphones but dumbphones”.

Moving forward, we agree with Kostakis et al. (2018) and with the views expressed by participants in the 2022 Policy Labs: digital sobriety should be systematically adopted by projects for digital commons to become a viable alternative to the unsustainable capitalist technological development. Digital commoners will need to autonomously decide whether to inject sustainability into their projects, document and disseminate best practices, develop collective greenIT skills, build alliances enabling them to relinquish their dependence on Big Tech, and create a shared ecological culture.

4.2. Resisting Capitalist Exploitation: For the Ecological Protectionism of Digital Commons

In the face of capitalist hegemony, Wright (2019) reminds us that it is not enough to propose viable alternatives: one must also commit to resisting this hegemony “from below”. One of the key battlegrounds in the digital realm since the 1980s has been the domain of intellectual property rights. The free software movement employed an original “jiu-jitsu” strategy, turning the strength of exclusive intellectual property rights against themselves to mandate inclusive intellectual property rights through free licenses (such as the General Public Licence, or GPL). This critical resistance was then co-opted by firms: Microsoft’s “informational capitalism” (firms protect the value of their closed proprietary systems) was superseded by Google’s more flexible “digital capitalism” in which firms integrate the commons into their business model (Broca and O’Neil, 2021) and prioritise mobile and cloud business models using big data and artificial intelligence (Birkinbine 2020; Lund and Zukerfeld 2020). Further, new cloud-based mechanisms such as Software as a Service (SaaS) negate the sharing capacity of the GPL. In a SaaS mode, a software program is never downloaded and executed onto the customers’ machine, but executed remotely on the provider’s hardware. A subscription to a service is bought, rather than a user licensing agreement being accepted. This creates a SaaS “loophole” in the FLOSS principle, as the service provider is no longer obliged to offer access to the code (O’Neil et al. 2021). In the case of Precious Plastic, we found that some firms were using open-source machine plans without contributing back to their development, typical “free-riding” behaviour.

To bolster the legal arsenal of digital commons and safeguard them from capitalist appropriation, legal experts have devised two novel types of licenses (Said Vieira and De Filippi 2014). Reciprocity licenses condition access and usage of the digital commons to user contributions; Copyfarleft licenses such as the Peer Production License (PPL) govern access based on adherence to specific ethical criteria by organisations (e.g., cooperatives are treated differently than firms). Coopcycle, a federation of bicycle delivery platform coops, introduced the Copyleft license in 2020, which permits platform usage solely for delivery services operated by cooperatives using eco-friendly transportation methods such as bicycles.

These licenses represent important new legal tools to resist the appropriation of the digital commons by digital capitalism for non-ecological purposes. However, they conflict with the open logic that has prevailed in the free software movement, which limits their adoption. Following Bauwens et al. (2019), we suggest that, like Coopcycle, digital commons collectives should employ these legal strategies, to shield common resources from capitalist exploitation and to promote eco-friendly practices, achieving what we call the "ecological protectionism of digital commons". While not yet legally effective, Lund and Zukerfeld (2020, 300-301) have also introduced the Commoners License Family (CLF), building on the PPL and modelled on the Creative Commons 'family' model of licenses, which takes a better account of commons-based peer production and aims to defend it better against capitalist exploitation.

4.3. State Support and Contribution to Ecological Digital Commons

While interstitial, "from below" strategies enable both confronting and navigating the spaces within digital capitalist hegemony, the digital commons movement must also engage in symbiotic, "from above" social mobilizations and lobbying practices to enrol support from public actors. Our previous research has documented alliances formed by the digital commons movement with European political parties and public administrations (Shulz 2019). This support is pivotal to mitigate the economic shortcomings of digital commons, by creating a regulatory framework conducive to their flourishing. However, such a regulatory framework has its limitations and also needs strong enforcement and operationalisation: the seemingly sober principle of 'data minimisation' is part of EU data protection law but as Koops (2014) critiques, based on the vast amounts of digital data in existence, "[w]ho in his[sic] right mind can look at the world out there and claim that a principle of data minimisation exists?".

4.3.1. Financial and Economic Policies

The first set of proposals pertains to the financial and material support from public authorities towards eco-friendly alternatives to digital capitalism. Some public entities have already become primary clients of cooperative enterprises that develop eco-friendly digital commons. Public procurement represents a key lever for supporting specific economic actors and practices (Le Crosnier 2021). In the case of Mobicoop, the incorporation of social and environmental criteria limits the cooperative's economic growth but could provide a compelling argument for establishing partnerships with progressive and environmentally conscious local authorities.

Furthermore, local and national public authorities are experimenting with economic policies in favour of digital commons, as demonstrated by successful implementations in Brussels (e.g., Platform Coop[15]) and Barcelona (e.g., Matchimpulsa[16]). National and transnational public investment funds (e.g., European funds) could also direct their investments towards eco-friendly alternatives to digital capitalism. As the 2022 Policy Lab focus groups made clear, these practices are already in use and could be extended. Examples include the French Banque des territoires participation in a fundraising effort for Mobicoop; the "citizen initiatives accelerator fund" of the Ministry responsible for digital affairs, which since 2021 has supported the upscaling of nine digital commons including OpenFoodFacts, an open database aiming to develop a metric for the health impacts and carbon footprint of food products; and the "Manufacture de

[15] See: https://platformcoop.brussels/, accessed on 06 March 2024

[16] See: https://matchimpulsa.barcelona/about-matchimpulsa-eng/, accessed on 06 March 2024

proximité" economic policy, endowed with €30 million, which has funded a hundred productive shared workspaces to foster the relocalisation of small-scale manufacturing industries based on commons-based peer production.[17]

4.3.2. Public Contributions to Ecological Digital Commons

Beyond financial support, public actors can actively contribute to the development of eco-friendly digital commons. They can become shareholders in cooperative platforms, as exemplified by Mobicoop. By joining and promoting shared governance models, public entities contribute to the development of economic activities that are deeply embedded in the socio-political fabric of local communities. These public-commons partnerships represent an alternative to public-private partnerships (Fattori 2013; see also Dafermos and Kostakis 2015; Shulz 2024).

Public entities can also make public resources available to digital commons projects. This could take the form of local authorities or public universities providing space to host distributed manufacturing collective workshops based on digital commons, as already happens for some French fablabs and makerspaces. In the same spirit, offering free parking for delivery or carpooling services that rely on cooperative platforms is a tangible form of public contribution. Public entities can also allocate space on Web Servers to hosting ecologically-conceived open-source software.

Finally, public actors can actively participate in the development of digital commons that serve the ecological transition. As reported by the director of the French National Institute of Geography during one of our 2022 Policy Labs, "our administration is developing a Human Resources policy aiming to enable civil servants to contribute to digital commons such as OpenStreetMap, which play a critical role in enhancing the understanding of the Anthropocene".

These supportive public policies and contributions sketch out a "partner state" for the digital commons. The "partner-state", a notion popularized by Bauwens et al. (2019), was regularly used by activists and commoners during Policy Labs' focus groups, demonstrating the anchoring of this symbiotic strategy within the French digital commons movement.

4.4. Domesticating Digital Capitalism: Confronting Big Tech's Non-Ecological Practices

An alternative form of symbiotic or "from above" engagement with the state (Wright 2019) seeks to neutralize digital capitalism's environmental harms. By advocating for policies that incentivize and protect eco-friendly digital commons initiatives, the movement can foster a more sustainable and equitable digital landscape via legislative action. The French digital commons movement is thus advocating for the implementation of robust environmental regulations and policies that hold digital corporations accountable for their ecological impacts. This includes pushing for stricter emissions standards, waste management practices, energy efficiency and right-to-repair requirements for digital goods and infrastructure. Fairphone's Head of Software Sustainability outlined during one of our 2022 Policy Labs: "we engaged with French legislators during the drafting of the 2020 smartphone reparability law, and we had to fight significant opposition from big phone makers lobbyist during long meetings". Additionally, lobbying for greater transparency and accountability in the digital product supply chain can help expose and address environmentally harmful Big Tech practices. The 2016 French Digital Republic Act introduced the legal category of "data of general interest",

[17] See: https://tierslieux.anct.gouv.fr/fr/programme/manufactures-de-proximite/, accessed on 06 March 2024

which public authorities could request from firms (as they already do for public statistics or tax audits) to monitor the ecological impact of their activities, on the one hand, and to obtain data that could be useful for the governance of the ecological transition, on the other. However, as one public official reported during a Policy Lab focus group: "this legislation is underused by public authorities".

The movement should actively support the development and implementation of laws and regulations that promote platform cooperatives. Engaging in legislative battles to challenge the dominance of data-intensive and resource-intensive digital platforms can pave the way for a more sustainable digital ecosystem. By promoting alternative, eco-friendly models and advocating for measures that limit the market power of large digital corporations, the digital commons movement can help level the playing field and create space for environmentally conscious alternatives.

5. Conclusion

In the context of the colossal socio-economic challenges imposed by the global ecological catastrophe, the fact that digital commons are governed by the contributors who produce them means these projects and communities can mandate that their production is digitally sober. For this to happen, the following idea will need to be widely debated: unlimited technological development is environmentally unsustainable. The "technological intoxication" which lies at the heart of industrial over-development takes many forms. The deeply rooted fetish that "more advanced technology is always better" held by many digital commoners in general, and most free and open-source software developers in particular, will thus need to be confronted. Everyone concerned with the Earth's survival will need to come to terms with the fact that a common future may well depend on technological sobriety, on the self-governance of digital means of production, and on effective political strategies to oppose an unsustainable digital capitalism. Our consideration of the digital commons shows some ways forward for achieving this environmental sustainability and sobriety for digital technology.

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Understanding Racism in Digital Capitalism. Racialisation and De-Racialisation in Platform Economies, Infrastructural Racism and Algorithmic Opacity

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Abstract: Recent literature has argued that digital technologies reinforce existent inequalities along race, class and gender. However, the relationship between digital capitalism and racism is yet to be explored in depth. How does digitalisation rework social relations and social cooperation to produce new forms of racialised hierarchisation and differentiation? The article is based on an international project on platform labour spanning seven European cities. It focuses on the sector of ride-hailing in Berlin and analyses the interactions between processes of platformisation and (de-)racialisation. Finally, it shows how racism becomes infrastructural when platforms organise its circulation.

Keywords: platform labour, racism, migration, digital capitalism, platform capitalism, racialisation, Uber

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1. Introduction

In the past years, renewed interest has arisen in the relationship between racism and capitalism (Fraser 2022, Melamed 2016, Bhattacharyya 2018). Highly debated and even contested is the question of whether racism is necessary for capitalism to thrive (see Conroy 2022). Nevertheless, it is largely agreed that racism and capitalism as systems of domination have both a common history and a present marked by context-specific conjunctures and interactions. The expansion of capitalism rests on those labouring populations made disposable through disparate forms of primitive accumulation. To enter into relations of exploitation, they must be separated from modes of non-capitalist social reproduction. "Racism", affirms Jodi Melamed, "enshrines the inequalities that capitalism requires", it provides the ground for social separateness (Melamed 2016, 77). Capitalism thus flourishes when it can extract value from relationships of exploitation and expropriation put in place by the interaction between socially distinct, antagonistic, and unequal subjects. The renaissance of the concept of racial capitalism helps to understand this nexus, it both challenges the fallacies of Marxism regarding colonialism and imperialism and requires the analysis of racism to take newer developments of capitalism such as neoliberalism and exploitation of diversity into account (Melamed 2016). Similar to how materialist feminism has pushed to expand the analysis of capitalism beyond the focus on production and masculine labour, the analysis of racial capitalism pushes us to think of the modes of co-constitution of race and capital (Fuchs 2018).

The unity and homogeneity of capitalism, however, is now more contested than ever. The scripts of capitalism vary across geographies and temporalities and must be

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analysed accordingly, avoiding one-size-fits-all theories (Peck and Theodore 2007). Recent literature highlights distinct but crucial aspects and attributes of contemporary capitalism, which seem to coexist, depending on which angle of analysis we choose. It seems more correct to acknowledge that multiple vectors expand capitalist logics, modes of production and accumulation at the same time. Among these, the transformations of capitalism brought by digital technologies constitute an expanding field of studies. Zuboff mentions "surveillance capitalism" (Zuboff 2019), others refer to "digital capitalism" and "big data capitalism" (Schiller 1999, and more recently Fuchs 2019, 2021, Pfeiffer 2021) and Srnicek suggests the term "platform capitalism" (Srnicek 2017). In the past decade, the question of how race relations are reworked through the advent of digital capitalism has been more addressed but is still largely unexplored (McMillan Cottom 2020; Hamilton 2020; Benjamin 2023).

In the article, I investigate the ways racism as a system of unequal relations relates to the dynamics of the accumulation of capital sparked by digital platforms. While I will not be able to talk about all forms of digital capitalism, I will focus on platforms as one of the most important vectors of capital expansion in the present day.

Digital platforms are themselves not easy to define. Srnicek provided a useful classification of platforms according to their function and what they do, namely advertising, cloud, industrial, product and lean platforms (Srnicek 2017). According to Grabher and König (2020), platforms can be considered as infrastructures (Plantin and Punathambekar 2019), ecosystems, and match-making markets (Evans and Schmalensee 2016). Other authors have investigated the ideologies around the rise of the sharing economy, and the logic of organizing, distributing and governing resources which platforms propagate (Andersson Schwarz 2017).

In this article, I will relate to platforms as infrastructures able to organize the mobility and circulation of scripts, emotions, capital and labour. I am interested in showing how those platforms which organise labour and provide services for social reproduction relate to racism. Far from making universalising statements, I will illustrate empirically the specific contribution made by these platforms to the development and fixing of forms of racism, even when they might seem contradictory or trivial. I focus on the category of "lean platforms" (Srnicek 2017), including those platforms such as Airbnb, Deliveroo, Helpling and Uber. I will pay mostly attention to the latter, which I have researched more in-depth, and which stands out as particularly interesting to study the relationship of platforms to racism. In the next section, I will provide a methodological frame for the article. I will explain on which data it is based and my stance towards writing about racism as a white researcher. Following, I will proceed to highlight two main arguments. Firstly, I will show how platforms relate and interact with processes of racialisation and de-racialisation, considered as processes of race-making and unmaking. To do this, I will use the concepts of marketisation and racialisation. Secondly, I will focus on how platforms organise the circulation and blocking of racist scripts, making racism infrastructural. I suggest that such an enterprise can contribute to drawing a bigger picture of the restructuring of racism and capitalism in present times.

2. Methods – Research Notes, Positionality

The article is mainly based on extensive research carried out between 2019 and 2022 at the international project "Platform Labour in Urban Spaces". In the project, researchers from universities, labour cooperatives and third-sector organisations from eight European countries produced a qualitative and quantitative investigation on the impact of platforms on labour, urban economies, and regulation of the involved industries. The project focused on four platforms (Airbnb, Deliveroo, Helpling, and Uber) and seven

European cities (Barcelona, Berlin, Bologna, Lisbon, London, Paris, and Tallinn). The present article discusses the findings of the qualitative part of the research, which entails over 220 interviews with platform workers, managers, and key stakeholders in the respective industries. In this research project, together with my colleagues, I coordinated the qualitative research in the other cities of the project and carried out part of the interviews with workers and stakeholders located in Berlin. Firstly, the article will refer mainly to interviews carried out in Berlin with platform workers, and in particular Uber drivers, and with two additional interviews with workers of the grocery delivery platform Gorillas. The Uber drivers were contacted via the app and were asked for an interview and interviewed during the ride. The interviews were carried out in German and Turkish. The interviews concerned three main topics, i.e., labour process, labour protection and skills, but also involved questions about socio-demographic factors and migration experiences. In the article, the analysis will focus on the implications of platform labour for processes of racialisation within and outside platforms. To deepen the understanding of the intricacies between platform labour and racial capitalism, in Spring/Sommer 2023, I carried out interviews and informal conversations with ten Uber drivers in Berlin.[1] These conversations centred on migration experiences, residency status, and experience of discrimination.

The article intends to shed light on the relationship of platforms and platform capitalism to racism. As a researcher, I use data collected and produced by and with interview partners. I am aware of the imbalance of power and social recognition entailed in researching poverty, exploitation, and inequalities of all sorts. As a white researcher, writing about racism makes it inescapable to risk reproducing othering processes and enforcing racialised social inequalities, hierarchies, and asymmetries. Further, researching racism from a white point of view means running the risk of neglecting crucial aspects of the social context under investigation (Duneier 2004).

I will try to give space to the words of the people interviewed, in particular an Uber driver who disclosed many crucial points about the relationship between racism and platform work.[2] I offer the data to the public for further analyses, critiques, and contestations. The research cannot be considered an ethnography, since too little time was dedicated to being with the interviewed subjects and participating in their everyday life (see Rosenblat 2018 for an ethnography of Uber drivers in the US). However, I will attempt to pay attention to the racialised and classed mismatch and to take the accounts of platform workers about their lives and their perspectives on the platform economy as seriously as they deserve.

3. Racism as Input and Output: Platforms and Processes of (De-)Racialisation

3.1. The "More-Than-Double Movement" of Platformisation

Platform economies have spread across the world at a fast pace in the past ten to fifteen years. After the global financial crisis, huge masses of venture capital flowed into both established platform companies such as Uber and Airbnb, and newly rising unicorns, such as Gorillas and Getir. Platforms enter already existing economies and

[1] After a knee surgery that impaired my mobility for one and half months, I regularly used the app to go to my routine medical visits and physiotherapy. During this period, I came to know Uber as a company that provides the cheapest way to navigate the city for people whose mobility is strongly limited. I want to thank all the drivers who never missed an occasion to make me feel welcome in their car and always had kind words for me.

[2] The interview was carried out by my colleague Valentin Niebler. I want to kindly thank him for sharing the precious interview (of course in accordance with the informed consent obtained).

typically bring turbulences into their composition, regulation, and organisation. Through the injection of massive capital into these economies, they present themselves as newly arrived but lumbering economic actors. They lobby at local and supralocal institutions, present themselves to the public with bulky advertising across cities and the internet, and allure thousands of labouring bodies to work for them.

Behind the ideological façade of disruption and innovation, however, platforms adapt very pragmatically according to the social, economic, and institutional context in which they operate (Vallas and Schor 2020). For instance, recent developments show that in the West-European context, the original model of freelancing is not dominant. Rather, where sectors are more deeply regulated, platforms adopt hybrid approaches, including intermediary agencies and companies which provide them with the labour force, as it happens in many other sectors dominated by labour precarity (see Niebler et al. 2023a). In other cases, platforms let the workers formally decide whether they want to be employed or freelance, as in the case of Helpling in Berlin (Niebler et al. 2023b).

With the Polanyian term of marketisation, we can address the process of entering new markets sparked by platforms (Polanyi 1959, Grabher and König 2020). and connected to the mobilisation of the labour force and the rise of new consumption patterns. Rather than considering platformisation as a one-way and heterogeneous process, through which groups of labouring bodies are mobilised and practices of social cooperation and reproduction commodified, I adopt the suggestion to "push beyond the categories of market and non-market in the platform economy" developed by Grabher and König (2020). To do so, I accept that markets are formed at a crossroads of a host of different logics and rationalities", among which the neoclassical economy is only one (Berndt et al. 2020). This perspective supports a "softer" understanding of platformisation as entailing multiple directions and a more complex relationship to processes of separation and racialisation of labour. Further, it helps to see labour agency beyond established, institutionalised and canonical forms of collective resistance. The research carried out and presented in this paper shows markets in the making and unmaking and takes the perspective of markets as frontier regions (ibid.), in which negotiations and valuations are relatively fresh and particularly flexible.

The research on the four platforms Uber, Airbnb, Deliveroo and Helpling demonstrated that platform companies often relate in similar ways to processes of racialisation when they enter new markets. This article considers the variable of labour as a crucial one when exploring the market strategies of platforms and of course economic actors in general. Platforms need cheap, flexible, and interchangeable labour power, to stay flexible and adapt to the high dynamism of financial markets, upon which they depend. To do so, they change strategies at a very tight temporal pace. As elaborated elsewhere (Animento 2024), platformisation often follows two main phases. Firstly, platforms arrive in a new urban market accompanied by pervasive marketing campaigns which promote on the one side innovative, faster, and more efficient forms of consumption, on the other side labour opportunities based on autonomy, diversity and entrepreneurialism. As an example, in metropolises such as London and Paris, Uber and Deliveroo have actively advertised job opportunities in poor and peripheral districts, where a large part of the population has migrant backgrounds. In Berlin, Helpling has developed a marketing strategy targeting gender equality and diversity. Further, the initial phase is marked by relatively better working conditions, better pay and perks such as free gadgets and discounts. On the consumption side, perks and discounts also aim to attract as many clients as possible. This phase has the goal of producing a large pool of labour force available to the company to scale up quickly and become

a leader in the sector. Our research shows that in newly arrived platforms workers present high diversity in terms of origins, migrant backgrounds, and social position. Here, the young white student and the racialised refugee might queue close to each other at a ghost kitchen waiting for their order before leaving, each one directed to his or her address of delivery.

While the first phase is marked by expansion and hyper-diversity, the second phase consists of shrinking and adjusting to the local market. Platforms usually adjust their institutional set-up for several reasons. One main reason is regulation: after the initial disruptive phase, regulative entities both at local and national levels might intervene to "curb" platform economies by applying existing laws or even producing ad hoc ones, as in the case of the so-called "ley de rider" in Spain. As research across countries shows, such attempts at regulation often fail their objectives, sometimes even worsening the labour conditions of workers. Platform companies excel in finding legal loopholes and semi-formal ways of operating in new markets. Other reasons for the readjusting of the business model are macroeconomic and financial shocks or, importantly, labour struggles and workers' advocacy. This phase of adaptation, however, also entails changes in the labour composition. When platforms need to downsize or get settled, labour conditions usually worsen, often with unilateral and abrupt changes. The type of pay might switch from hourly to piece pay (as in the case of Deliveroo in the UK and Germany), bonus systems might get discarded, while many labour relations are completely terminated, either through logout (in the case of the pure freelancing model) or through layoffs or non-renovation of fixed-term contracts. The phase of shrinking usually comes with a loss of diversity in the labour force, particularly in terms of residency status, migrant background, and social position. More precisely, those workers who can afford to leave the platform will move to comparatively better jobs, while those who do not will have to stay. According to the type of platform and the urban and national contexts, the dynamics of exclusion from the platform might change. However, across cities and platforms, our research, as well as research from non-European contexts (Zhou 2022) shows that over time the labour force active in platform economies becomes more heavily racialized and poorer. Further, COVID-19 impacted the business of Uber in Berlin, as in most other cities. Many interviewees left Uber during the pandemic and started again once the measures of isolation were reduced. While the interviews carried out for the PLUS project took place between and right after the beginning of the pandemic in 2020, the interviews which I carried out took place in 2023, when many drivers who had stopped their work during the pandemic had come back to ride-hailing, once the business recovered.

The processes of marketisation which platforms trigger often follow a double movement. During the phase of "embeddedness", in which regulatory instances intervene and tame the platforms, however, there is no improvement in the livelihoods of the labouring bodies which feed the platform economies. Rather, the alignment of platform models and regulations serves to move patterns of racialisation and ethnicity-making into the platform boundaries. The processes of racialisation which platforms interact with and even shape, thus, are more complex than the double movement could explain. They cannot be comprised within the boundaries of platform companies and cannot even be reduced to the present conjuncture. Rather, platforms rely on well-oiled mechanisms of hierarchisation of labouring bodies, leveraging the complex and cumulative matrix of migration regimes which have been applied for decades. Via their "more-than-double movement", platforms draw and redraw boundaries around labouring populations, putting different social and political subjects in connection to one another, but also separating and hierarchising them. An example is the "caporalato"

system which has developed in many platform economies in cities across the globe, as research (Peterlongo 2023). The selling out and renting of accounts enable illegalised migrants to work, by entering in relation with their "bosses", who often share the same migrant background. This stratification and diversification well embody the "densely connected social separateness" which Melamed considers the "hallmark of racial capitalism" (Melamed 2016, 81). Hereby, the construction and fixation of subjects and identities via the attribution of characters and qualities which go back to older racial scripts is crucial.

3.2. Platforms and Migration: Racialisation

Platform capitalism flourishes over processes of primitive accumulation stratified over time. Their need for a cheap and interchangeable labour force requires labouring populations that have few alternatives in the labour markets to choose from. Migration, while being a human trope and an act of autonomy (Mezzadra 2010), can also be viewed as the result of primitive accumulation, which separates people from the places they consider home with the hope of finding a livelihood elsewhere. Coming into conversation with Uber drivers, I asked them about their job, their families and how they liked it to be here. Many of them often ended up telling me similar stories and more specifically similar conclusions: if they could, they would go back to their home countries, which were mostly North African countries, such as Tunisia, and Middle Eastern countries, such as Syria or Afghanistan. Nostalgia for past, far away and imagined home countries is a common feature of migration and is part of the "double absence" experienced by migrants, as theorized by Sayad (1999). At the same time, the Uber drivers I talked to spoke of the feeling of being isolated, of living a life of work, with no kinship except for the closest nuclear family and a few more, with neither friends nor free time. The sense of being integrated into a system aimed at making profits must be seen along with their capacity to compare it to their home countries. This capacity of comparing different varieties of capitalism, and their different social and racialized position suggests how to understand the processes of capital accumulation exerted over their bodies. The social separateness that many platform workers experience started with their migration from their countries of origin, and often with the migration of their parents or grandparents.

This article contends that racialisation must be understood as relational, as it entails a never-ending process of re-articulating subjects in relation to others and to the fluctuations of capital accumulation which come along with technological transformations, changes in political entities and production of knowledge, and labour conflicts. I define racialisation as the process of allocating individuals and groups into a hierarchical and unequal system of race relations. Such a system, however, is never stable or settled, but rather prone to change and re-configuring. Racial formations, as theorised by Omi and Winant (1986), emerge at the intersection of politics, economy, and society. In the following, I will mention three examples to illustrate how platforms interact with processes of racialization. Finally, I will provocatively use the concept of de-racialisation to challenge static and one-way perspectives on the role played by platformisation in processes of racialisation.

The first example concerns the role of law and migration regimes in forging flows of mobility and immobility from and to platforms. When platforms start downsizing and worsening labour conditions, workers with secure residency can quit their jobs and move to a comparatively better one. For these groups, platform work can represent a stepping stone (Van Doorn 2020). This is the case of Margherita, whom I interviewed in 2021. At that time, she used to work in Berlin as a rider for the platform of grocery

delivery Gorillas. Of Italian nationality, Margherita decided after one year to refuse to sign the renovation of the contract and instead receive unemployment benefits, while she could complete her German course and then apply for a job more fitting her educational background. On the contrary, migrants with fixed-term visas are often obliged to stay at their workplace, because they are not entitled to benefits. Via this process of "differential exclusion" (Mezzadra 2010), which goes hand in hand with the racialisation of certain groups and the re-racialisation of others, the platform labour force tends to become more homogenous in terms of status residency over time. Workers whose permit of residency is bound to a labour contract will have to stay put, with the platform able to squeeze conditions down to a lower level.

The second example refers to the formation of a labour force predicated upon inferiority, which has come to accompany processes of racialization concerning newly arrived migrants and refugees. The taxi drivers whom I interviewed in Berlin manifested a strong antagonism against Uber drivers, as in many other places elsewhere (Gebrial 2022; Hua and Ray 2020). Uber drivers were described by taxi drivers as not capable of doing their job, as illiterate and therefore hyper-exploitable, and dangerous. Across Facebook groups for taxi drivers, a recurrent narrative about the incapacity and disqualification of Uber drivers emerged, which oftentimes resulted in smear and hate speech. The taxi drivers interviewed were themselves migrants of the second or third generation, with roots in Turkey and the Balkans. They explained that their everyday work life is very similar to the one of Uber drivers; much digitalisation has taken place in the traditional taxi sector, too. In fact, the taxi and ride-hailing sectors are both largely dominated by racialised migrant labour, but the advent of platforms has created or cemented internal fractures between the deserving and the undeserving drivers. By adapting to the regulation of private vehicle transport (different from taxi transport), platforms enlarged the pool of labouring bodies, to encompass newly arrived migrants and refugees, who might have had otherwise difficulties in entering the highly regulated sector of taxis. Opposition to the Uber model by taxi drivers has easily become translated into hate against Uber drivers, who are considered less integrated and unworthy. However, digital inquiries across Facebook and WhatsApp Groups revealed that many taxi drivers also work parallelly for Uber and other ride-hailing apps. The stark division between taxi and Uber drivers, upon which such strong antagonism is predicated, is more than blurred. Again, the stratification of migration regimes emerged in the process of racialising Uber drivers as a tool for partition, social separateness, and conflict between migrant "generations". In Berlin, as elsewhere, migrants of different generations share many experiences and systemic racism, but also experience important differences regarding the state treatment of their status as mobile, migrant, or post-migrant citizens. While the division is not at all clear, Uber drivers have come to represent the underprivileged and excluded workers. Even those taxi drivers, who used less harsh words when talking of Uber drivers, referred to them as too powerless to resist and face Uber for its merciless treatment of workers. Uber drivers become racialised even if they are not classified univocally, but are rather generically marked as inferior, unable, and still threatening because of their alleged compliance with the expansion of platform capitalism.

While platforms might redraw boundaries of the labour force considered inferior and disposable, however, in some cases, they might provide a bridge between different generations of migration and support the strengthening of kinship relations based on entrepreneurialism. This is the case of Mohammed, with whom I had a conversation during a taxi ride. He arrived in Germany from Tunisia at the age of 17 (he is now 30) to visit his uncle, and then stayed after finding a job. Then, he started a security

business in East Germany together with his uncle and his family. Since the business performed poorly, the whole family moved to Berlin to open a private vehicle company, cooperating with Uber. Mohammed was positive about Uber and considered it a good company to start a business with, which in this case was successful and expanding. In his case, through the platform, he had been able to improve his livelihood by reinforcing his ties with his uncle's family. However, when asked if he liked living in Germany, and if he was satisfied with his achievements and his life, he admitted that he considered his move to Germany a mistake, which had happened without him realising that it would be a decision for life.

Mohammed is now the co-owner of a subcontracting company which works for Uber. Other literature based on the PLUS project showed that workers in subcontracting companies have formal contracts, but often work for more hours than those written on their contracts and are exposed to multiple forms of exploitation (Niebler et al. 2023a; Animento 2024). On one side they are exploited in a more classical sense by the subcontractor, who is their formal employer, on the other side they are exposed to the algorithmic management developed by Uber. At the same time, subcontractors interviewed in the research admitted that only companies with a large fleet are successful when doing business with Uber. Two interviewees reported that they had started their own company, but after one or two years got back to simply driving because the business was not worthy and profitable. The separation between drivers and subcontractors among migrants, even when they belong to the first generation, shows a further albeit precarious partition brought by the platform.

3.3. …and De-Racialisation?

Processes of platformisation of economies and industries are deeply intertwined with complex patterns of racialisation that are placed both inside and outside the boundaries of platforms, and both in present and past times. However, to tell the story that platforms intervene in race relations only to reinforce them would be superficial. Migrant workers with precarious status and a whole history of exclusion in the labour market often referred to platform work as the first job in which they did not feel considered as part of an ethnic or racialized group. Assan, a former refugee from Afghanistan, who had struggled since his childhood to achieve a decent livelihood in Germany, declared:

> "I was left with no other job in this world. Uber was my one and only chance. Why Uber? Uber has an advantage for us foreigners, it doesn't judge us. Really, that's the only thing about Uber. Uber doesn't care if you can speak German, if you're good-looking, whether you are tall, or short, whether you close your eyes when you laugh or not. No one cares. So a very loyal company as far as drivers are concerned."
>
> [Uber_Ber_8]

Uber as most platforms, are not considered part of the "German" economy, of the economy of the majority in Germany. Rather, they were often referred to as "American companies", the origin of which should be placed outside the national borders. I suggest that such detachment of platforms from the frame of the national economy is linked to the perceived de-racialization which Assan expresses. He goes even further, arguing:

> "And you will never get into an Uber car where Peter Meier is driving, it's either Mustafa, or Mohammed, or / Uber is actually an Arabic company [laughs], the driver is called Mohammed, Mustafa, Ahmed, Hussain … So only foreigners are driving. That's the reason. Because you are not put in certain levels. You don't have to kiss anybody's ass, you don't have you don't have a superior, you are your own boss, you do what you want."
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> [Uber_Ber_8]

Barot and Bird define de-racialisation as the "removal of the idea of race and its alleged consequences from a discourse, such that a group which is constructed and defined as a race may present itself in the public domain in non-racial terms" (Barot and Bird 2001, 614). They also admit that the concept is much less debated and used than racialisation (which is still part of ongoing debates, see Hochman 2019). Assan's statements, which resonate with empirical data in recent literature (Purcell and Brook 2022; Anwar and Graham 2021), should be taken seriously. The subjective experience of platform workers might clash with accounts of the impact of digital technologies on racism, but it opens the question about how platform workers as classed and racialised subjects might develop spaces of autonomy.

Much literature has now been written on how digital capitalism interacts with race relations (Fuchs 2018; Noble 2018; Hamilton 2020; McMillan Cottom 2020; Benjamin 2023). While in "Algorithms of Oppression" Noble focuses on racialising bias in search engines, in "Race after Technology" Benjamin provides an extensive investigation of digital technologies which pretend to be neutral but instead reinforce racism. She adopts the term "New Jim Code" to define those "subtler and even alluring forms of coding [racial] inequity get a pass" (Benjamin 2023, 56) against the more visible forms of racism such as White supremacy discourses and hate speech against Blacks on social media. Digital technologies are often marketised as progressive and diversity-welcoming. Benjamin speaks about the "illusion of progress and neutrality" (54) which these technologies propagate. In our research, Uber drivers are very much aware that working for the app is not a good job, but they often argue that it is the best job that they could get, not secondarily because of the absence of a human boss in their everyday lives on the streets.

The liberating effect of not having to face a possibly racist employer, to escape some forms of everyday racism from their boss and superiors, is a crucial factor for workers. The feeling of emancipation from racialisation still holds even when workers recognize that their labour conditions are poor, that they are exploited and exposed to oppression and the unpredictable arbitrariness of algorithmic management. This applies to Assan, too, who later in the interview will remind one episode in which he was blocked by the app for no reason, to discover after many days, that it had been just a mistake of the Uber app itself. The ambivalent relationship of platform labour to migrant and racialised subjects resonates with Benjamin's argument that digital capitalism values and devalues diversity and Blackness at the same time (Benjamin 2023, 63). As elaborated by Kornberger et al. (2017), platforms are evaluative, in that they undergo processes of valuation in which new economic subjects are forged. The liberating effect attached to valuation, however, comes with the price of exploitation and dependence on the platform.

Platform workers feed the algorithms of the owner companies with a bulk of personal data in real-time, over which they have little to no control. However, the extraction and processing of their data is hidden "behind the screen", leaving them with the

perception of autonomy. The opacity and "black boxing" which digital technologies pursue, enable workers to experience de-racialization when interacting with the app. Platforms hide social processes behind algorithmic calculation, which is presented as neutral from societal dynamics and failures. At the same time, opacity can also become a condition favouring collective agency, when it is used to make oneself unseen. While algorithms are more and more capable of seeing through people's behaviours, ideas and bodies, there is always an outside that they cannot capture, an outside that can be productively turned into a tool for a better livelihood.

4. Infrastructural Racism

To complete the picture, I now pass to illuminate another crucial aspect of how platforms relate to racialization, beyond reinforcing or undermining it, that is by organizing the circulation and mobility of racist scripts. While racism can both constitute an input and an output of technologies processing data, I now want to focus on the definition of platforms as infrastructure, and the capacity of platforms to make racism circulate and connect subjects which were previously disconnected. Platforms affect the experience of everyday racism of workers in that they hide the racist boss behind algorithms. The figure of the boss, however, is only one among the subjects who come to judge and value platform workers. Here, I want to show how the patterns of labour relations produced by platforms structurally differentiate the economic subjects which they connect with each other. Workers, who are most often migrants, are exposed to multiple forms of oppression.

Lean platforms are usually part of the service economy, in which relations of labour are not reduced to the employer-employee one (Animento et al. forthcoming), but rather encompass the relationship between clients and workers. Each platform in each city has its specific structure of labour relations. For instance, Deliveroo links riders with restaurant workers and customers. Helpling connects cleaners to customers, with no further intermediation. In turn, due to increasing professionalization, Airbnb has come to connect customers to agencies which in turn employ workers to manage the apartments. Like Airbnb, Uber is a good example to show how different structures of labour relations have differentiated over time. It started with the model typical of the platform economy based on freelance entrepreneurs but is now often operated with a model based on subcontracting companies, drivers, and customers, at least in Europe (Niebler et al. 2023a).

Platforms can be defined as infrastructures (Plantin and Punathambekar 2019), which connect economic subjects, functioning as "match-makers" (Graber/König 2020; Evans and Schmalensee 2016). More specifically, they have been defined as "evaluative infrastructures" (Korneberger et al. 2017) since a key logic of their functioning and success is valuation. Korneberger et al. provide an analysis of platforms such as eBay, to show how the economic interactions they facilitate rest on a system of reciprocal rating and evaluations. Economic subjects who are active on platforms develop over time a sensitivity for navigating trust and willingness to risk. Crucially, valuation systems such as rating and ranking are not necessarily symmetric and equal and reinforce discrimination by race and gender (Schor and Attwood-Charles 2017). In our research, we identified several asymmetries concerning the role and function of rating, according to which subjects are addressed by it. At Helpling, for instance, the ratings of cleaners by customers are key to the cleaners'' chances of getting more commissions. On the other side, cleaners can rate their customers, but such rating is not public. For this reason, Helpling cleaners in Berlin have organized to compile "blacklists"

of “bad” clients, to protect themselves and avoid both scams and bad treatments at work (see Niebler et al. 2023b).

What do rating and ranking systems in platforms have to do with racism? How does the infrastructural quality of platforms affect race relations? Again, Assan’s words help to disentangle these questions:

> “But I don’t know who’s sitting behind me, right? …and they are all wearing a mask [during Covid pandemic]. One driver could be in a bad mood, another one too slimy, or he will annoy you, he is too dreary, or too disrespectful. Everyone has a weakness. And in this short time, in this short moment that you have, you cannot really judge people, so they always get five stars from me, I don’t give a shit who they are. They can tell me a thousand times: you fucking foreigner. When they’ll get out of the car, I’ll still give them five stars. Because I know it won’t work on them, it won’t change anything. It’s just about a short while, he’s pissed off, I’ve caught him unfortunately with it, I have to go through with it.”
>
> [Uber_Ber_8]

Everyday racism, according to Philomena Essed, concerns “injustices recurring so often, that they are almost taken for granted, nagging, annoying, debilitating, seemingly small, injustices one comes to expect” (Essed 2002, 203). Assan here seems to refer to this type of racist encounter, which he comes to expect. Even if he could rate customers who attack him with racist behaviour, he would not, because he has no hope that that rating neither will affect the customer’s ability to continue his racist behaviour, nor of course will change the racist matrix he lives in. Rating systems in apps almost or never support workers to defend themselves from this type of everyday offence, which is also very difficult to document.

On the other side, Assan reported that he had received a bad rate from a client whom he identified as a Mexican businessman. During the ride, the driver, who came to Germany as a refugee from Afghanistan, admitted that he had made a negative comment about Arabic people and about refugees. The client gave him a bad rate and even filed a complaint at the platform hotline. In another interview, a white German female driver admitted that she had made a racist comment about foreigners during a ride, and she had received a one-star rating, which had lowered her ranking in the app.

Racism can circulate through the infrastructure of platforms, but valuation systems affect this circulation by sanctioning racist behaviour and speech in unequal ways. Since platforms aim at maximizing profits and acquiring a large pool of consumers in the shortest period, they structurally tend to protect consumers and expose workers. Locating their operations at the nexus between structural and interpersonal racism, platforms make racism infrastructural, in that they organize its circulation. This implies that platforms have the power to moderate racism or to perform a public service, as Benjamin argues (2023). Since their goal is profit-making and not equality or justice, their moderation of racist behaviours and scripts ends up reinforcing unequal race relations.

A final but crucial point is yet to be made. As the examples mentioned in this chapter and the previous one show, racist scripts circulate across the platforms in such a way as to explode any pretence of coherence. Taxi drivers with migrant experiences in their lives or the lives of their families attribute to Uber drivers’ qualities which were used not so long time ago to discredit their ancestors. Assan, an Uber driver who came as a refugee from a Middle East country comes to be badly rated because of a racist comment about Arabic people. A white female Uber driver, on her turn, suggests that

taxi drivers are not kind and respectful with customers, later stating that they are all foreigners. Racist scripts expand into a myriad of contradictory statements about ethnicities, races, classes, and groups. Here, I welcome Benjamin's' invitation to consider race itself as "a kind of technology, one designed to separate, stratify, and sanctify the many forms of injustice experiences by members of racialized groups, but one that people routinely reimagine and redeploy to their own ends" (Benjamin 2023, 84). In platforms, racism seems to be used by the subjects who are put in connection, to discredit others or evaluate themselves. It is used also to navigate interactions and transactions through the platform, to break down and explain structural antagonism and competition produced by the platform into everyday mundane pictures. Fluid encounters, such as those between taxi drivers and Uber drivers on the streets, trigger processes of boundary-making around the "illiterate", "primitive" and "simple" Uber drivers. These processes are reinforced by the platform economy, either through rating systems or social media platforms, in which taxi drivers download their anger against surging competition and lowering income. At the same time, the platform can present itself as outside of race relations, while it is its role as mediator and infrastructure which allows the circulation of racism in the first place.

5. Conclusions

The previous chapters provided an investigation of the multiple and contradictory ways in which platforms interrelate with processes of racialisation. I began by deploying the Polanyian concept of "marketisation" to address the process through which platforms enter new markets. Our research on platform labour on four platforms in seven European cities shows that platformisation often entails a "more than double movement". When they enter new urban markets, they try firstly to acquire as many workers and consumers as possible. Here, the degree of diversity among the labour force in terms of migrant backgrounds and residency status is very high. In a second moment, however, labour conditions at platforms worsen, and the most precarious and racialised workers might remain trapped in their jobs, while those who can find a comparatively better job leave the platform. Looking at this movement from the perspective of racial capitalism, I argued that racialisation can be both an input and an output of platformisation. Platformisation in its turn can both separate and connect groups of labouring bodies, reinforcing and blurring societal partitions of migrant labour at the same time, along with Melamed's claim that racial capitalism "separates forms of humanity so that they may be connected in terms that feed capital" (Melamed 2016, 79). Along with a bulk of literature on the topic (Benjamin 2023; McMillan Cottom 2020; Hamilton 2020; Noble 2018), our research thus confirms that digital technologies reinforce racism. However, it also aligns with literature showing how the algorithm hides the relations of exploitation and racial domination by separating both physically and virtually the worker from their boss (Purcell and Brook 2022). The analysis suggests that platforms organize the mobility of racism along their infrastructures, in fact making racism "infrastructural". Racist scripts circulate along the interactions and connections organised by platforms both online (through rating and ranking systems) and offline (through the fluid encounters generated by the operation of matchmaking carried out by platforms). The "infrastructuring" of racism seems to push further the disparateness of racist scripts across economies which are largely fed by migrants. Attributes of inferiority and superiority are increasingly detached from ethnic and national grouping in a world made increasingly by migrants.

The article leaves the question open about the kind of subjects which can arise in such a context, in which layers of migration regimes accumulate and produce singular intersections with relations of class and gender. How do digital technologies interact with these new re-configurations of racism? On one side, they make Blackness visible, in that they value migrant labour but also track, measure, and convert it into data, on the other, the White centricity of digital technologies cannot grasp or comprehend "generic Blackness" (Simone 2016; Benjamin 2023). What kind of practices and spaces of autonomy can arise among those who are "generalised" as inferior? While these practices are often informal, not narrated and not intelligible for algorithms, how can we – and should we? – investigate them? Further research might look into the multiple forms of simultaneous exposure to migration regimes, algorithmic management and labour exploitation, to understand which racial formations will emerge in the next future. To do this, the analysis suggests pushing the boundaries of analysis beyond the boundaries of platforms and to rather explore the connections between the insides and the outsides of platforms, to illuminate the making and unmaking of racism through platformisation.

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Labouring and Smiling: Re-Imagining Digital Colonialism in Africa, Silicon Valley Big Techs, and the Politics of Prosumer Capitalism in Nigeria

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Abstract: Does Africa suffer from the paucity of epistemic inquiry on digital capitalism, mostly, spearheaded by social media platforms within the confines of the global digital economy? The growing corpus of literature points to digital colonialism and prosumer capitalism as critical components in understanding the global digital economy. Yet, postcolonial Africa lags in the negotiation of power within the political economy dynamics of digital capitalism. Thus, in an age of big data, platformisation and extraction of human life, is there a reincarnation and excavation of colonialism of old in the form of digital prosumer capitalism in the continent? Using Nigeria as a geo-economic prism, the paper reimagines digital colonialism from a critical perspective. It seeks to discharge the underlying appropriation of economic power through digital colonialism; and show how prosumer capitalism grounds its practices in Nigeria, thereby, recentring the debate on digital economic inequalities given the global digital capitalism paradigm.

Keywords: Africa, Big Techs, data, digital colonialism, prosumer capitalism, platforms, Nigeria

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1. Introduction

Historically, the expansive nature of capitalism has been pervasive, penetrating nearly all spheres of our social being, morphing into different shades, times, media, and communication platforms. Following in that direction are the domains of communication capitalism, digital capitalism, information capitalism, and network capitalism (Fuchs 2009; Dean 2005; Fitzpatrick 2002; Schiller 2000) which have now recentred the debate on the political economy of communication as African societies, Nigeria and the world evolve in a supersonic speed. Van Dijck (2014) hypothesised about the spacious digital alteration of our social life through metadata, from insignificant platform-mediated products to valuable products that are augmented, extracted, and repurposed as substantial products and part of economic production. Far back in the late 19th century, Marx (1894) talked about the rapid expansion of capitalist production in a scientific bourgeois economy, where capitalism prevails through the capitalist modes of production. Most importantly, Africa is considered a huge supplier of resources and raw materials that often ignite innovations, mostly, through the mechanism of global capitalism. Thus, the spread of digital capitalism, and its deep roots through the frontiers of

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prosumer culture in the digital world is apparently instrumental to the re-enactment of colonialism in today's African digital spaces. Most often, the spread of social media platforms and the economic impact and incentives asserted by Silicon Valley Big Techs have created ecstatic scenes among African folks and even researchers with a grasp of Africa's digital ecosystem. This revolves around the horizons of colonialism, post-colonial and neoliberal economic activities (Oyedemi 2019), such that, an appraisal of the expansion of digital colonialism and prosumer capitalism within the continent becomes imperative because of the growing calls for African digital epistemic knowledge production (Schoon et al. 2020).

This expansionist tendency of capitalism has been spearheaded in recent times through digital technologies and network platforms, creating new economic geographies of capitalism and the reincarnation of colonialism particularly within the realm of dominance and labour exploitation (Howson et al. 2021; Taffel 2021; Jimenez 2020; Segura and Waisbord 2019) in places like Africa and countries like Nigeria. Other scholars have also approached the coloniality of digital technologies from a racial standpoint (Benjamin 2019; Melamed 2015), further calibrating Africa's place in global economic and digital inequalities. However, in an age of remediation of both online and offline spaces and integrated hybridity between the digital and physical spaces (Willems 2019; No et al. 2016), the universality of this phenomenon is not just by simply influencing the global political economy but also contemporary global communication and information ecosystem and the digital world in particular. Yet, the ubiquitous and borderless landscape of digital networks, mostly, American-based Silicon Valley Big Techs tend to spread capitalism and excavate colonialism in equal measure, and in the same swoop erecting economic dichotomies and inequality, mostly through prosumer cultures (see Figure 1) enabled by cultural shifts such as Americanization, McDonaldization, globalization, interculturality, and enforcement of global homogeneity both within the public and digital spaces (Antonio and Bananno 2000; van Elteren 2006; Fraysse & O'Neil 2015; Hallin and Mancini 2004; Mensah et al. 2018; Ritzer 2008). How then do all these intersecting dynamics of digital colonialism and prosumer capitalism hold sway in Africa and Nigeria in particular?

Further, Zuboff (2019) in a sense heralded these shifts, being taken over by information and communication technologies with deep capitalist roots permeating our day-to-day life and dictating every sphere of social participation. A broader context of this trajectory is that the concentration of hysterical neoliberal market systems and economy based on information (Mason 2015), non-optional, ubiquitous, and additive social networks (McChesney 2013) and the victimhood of new colonialism created through data collection and appropriation of human life (Couldry and Mejias 2019) in places like Africa tends to define modern-day capitalism in all facets *nay* colonialism. Mejias and Couldry (2024) further equated data colonialism with the confiscation of territories in Africa in the 19th century. Thus, the role of media and communication cannot be isolated from the global crisis of capitalism, whether from the standpoint of neoliberal digital capitalism or the neo-Keynesian model in a digital sense (Chakravartty and Schiller 2010; Means 2015), especially, that which focuses on economic growth and stability without recourse to employment, labour, wages, and workers benefits. Accordingly, it is this nexus and semblance with the capitalism of old that have compelled scholars to associate the prevailing economic influence of digital media with historical colonialism (Couldry and Mejias 2019; Mejias and Couldry 2024; Schneider 2022). Scholarly interrogation of digital colonialism often strives to showcase empirical cases and agencies of exploitation, profiteering, unpaid labour, *unconscious* production, and

resumption through what Couldry and Mejias (2019) termed distant digital communication infrastructure as the new form of capitalism.

A corpus of literature over the years has portrayed the degree to which this digital colonialism seems to be taking the form and shape of prosumer capitalism (Benyera 2021; Couldry and Mejias 2019; Fuchs 2020, 2009; Ramnarain and Govender 2013; Schneider 2022), such that, like in the past, the West is recentred as the dominant player. As Flew (2007, 31) aptly captured it, this overriding economic influence of Silicon Valley Big Techs comes with "existing economic structures of dominance in the media and communication industries…as site of cultural influence; the extension of corporate control; and growing commodification of media forms…" Taking cognisance of this structure, and as the world and the African continent become more digitalized in the platform society (Poell et al. 2021; van Dijck et al. 2018), the digital becomes a form of commodity and a productive silo for both production and consumption in the sight of the producer (West) and consumer (Africa). Invariably, data extraction and its agencies relatively connote another form of colonialism (Couldry and Mejias 2018). The puzzle in contemporary times is the combination of the channels of production and consumption, which Toffler (1981) first hypnotized as prosumer. Fraysse and O'Neil (2015, 3) stressed that structures of separation are constantly being undermined, "such as that between production and consumption" around the world, even in places like Nigeria. As a result of this, the ensuing commodification of digital consumption has habitually expanded both the theoretical and conceptual scopes of not just capitalism, but also colonialism, mostly within the confines of the African continent.

Hence, to fathom today's digital colonialism, there is an urgency to unearth the dynamics of new media communication technologies and platform capitalism (Papadimitropolous 2021; Vallas 2019; Langley and Leyshon 2017), and the extent they reincarnate historical colonialism within the prisms of labour, wages, and capital. In this study, attempts have been made to demonstrate not just the coloniality of digital platforms, but also how social media platforms help to dichotomise social economic inequality within digital capitalism. (see Figure 1 for further elucidation). Hence, the question is not whether there are similarities between the colonialism of old and today's digital colonialism, but the form and the spacious nature with which they operationalised these concepts seem to be at the centre of the intellectual debate, and how capitalism and colonialism converged digitally. Some scholars have also argued that this convergence somehow reinvokes the interrelationship between capitalism and colonialism (Madianou 2019; Papacharassi 2015), particularly, in the manner American Big Tech companies entrenched their corporate power (Flew 2007), heavily skewed economic gains and profits (Collier 2018) and the monopolisation for economic exploitation, undermining local markets and creation of dependency (Kwet 2021). These trajectories therefore offer us a glimpse to grasp the cascading digital capitalist colonialism in today's world. Mason (2015; xiv) explained that resistance to neoliberalism and capitalism has encountered a failure on several fronts, given that, capitalism's adaptability to changes enables the phenomenon to morph and mutate, fortifying itself against opposition, risks, and dangers, stressing that "information is different from every previous technology… its spontaneous tendency is to dissolve markets, destroy ownership and break down the relationship between work and wages. And that is the deep background to the crisis we are living through."

Further, despite this growing crisis associated with digital capitalism, there is not enough scholarly intervention in the (de)construction of digital colonialism and prosumer capitalism on social network platforms within the context of Africa and the continent's biggest economy, Nigeria. As the continent becomes more engrained in

the digital space, memories of unequal colonial economic power between African states and American Big Techs seem to be recalibrating historical colonialism in the 18th and 19th centuries where African territories were amassed; slaves and raw materials shifted to the West in boosting the industrial revolution (Berg and Hudson 2023; Eltis and Engerman 2000). In today's platformisation of society (Casilli and Gutierrez 2019; Poell et al. 2021), both the West and the Global South face an equilibrium in being exploited by Silicon Valley Big Techs in a colonial-like manner (The New York Review 2023). Unlike the interventionist approaches of the American government and the European Economic Council (ECC) like the European Union's General Data Protection Regulation (GDPR) in holding social network platforms accountable (Gorwa and Ash 2020; Flew et al. 2019), no such policy has been enacted by the African Union (AU), even on country-level. Such moves remain peripheral. This situation advances the imbalance of economic power in the age of digital capitalism. Figure 1 lays out this social-economic imbalance and inequality as obtainable in Nigeria, where Silicon Valley Big Techs are positioned for enormous capital accumulation, while the state focuses on taxable activities of the Big Techs, and content creators who generate income for the Big Techs are reduced to mere prosumers without wages.

With Africa having encountered both phases of colonialism – the historical and contemporary digital colonialism – and being the last entrant in the global economic power equation, a critical examination of digital colonialism and prosumer capitalism is key in unravelling these dimensions because of the thematic concentration of this volume – *Critical Perspectives on Digital Capitalism*. The work is not geared towards delving into the battles of epistemological studies centred on Anglophone and Eurocentric constructivism of (de)coloniality. However, the article explores the dynamics of digital colonialism and prosumer capitalism in Africa, relying on Nigeria as the continent's biggest economy by focusing on the politics, practices, and negotiation of power. It seeks to discharge the underlying appropriation of economic power through digital platforms like Google, Facebook and Twitter, and critique how prosumer capitalism grounds its practices in Nigeria. Succinctly, the article contributes to the growing field of the political economy paradigm of digital capitalism, repurposing the debate of digital economic inequalities through the African lens that has characterised global information communication capitalism for far more than three decades now. The paper therefore compels a scholarly endeavour that seeks to breach the acquisitive and materialistic gap that pervades African digital capitalism and colonialism, as far as digital labour and prosumer culture are concerned.

2. Literature Review

2.1. Re-Imagining Digital Colonialism in Africa and the Nexus with Communication Capitalism

With colonialism as a centrifugal lens to envisage the African continent, scholars explained that modern-day colonialism seems to have kick-started with the Portuguese searching for trade and commerce (capitalism) in the 1400s (Jeronimo 2018; Smilak and Putman 2022) in Africa and the rest of the world. According to Keating (2013), colonialism is still continually felt to date. This continuity has over a century morphed from colonialism – neo-colonialism – to contemporary digital colonialism, *vis-à-vis* communication capitalism, rebranding both the trenches of capitalism that spearheaded colonialism itself in the 18th century. What then enhanced historical colonialism? Tracing Africa's colonial history, Crowder (2023) observed that between 1885 and 1906

where Western colonialism subjected the continent to Western European rule, communication and technological revolution also accounted for the entrenchment of colonialism during that era. Often, these communication and technological infrastructures are transposed and transplanted from the West to Africa for colonial purposes (Eribo and Jong-Ebot 1997). Worth (2014) also collaborated with this line of thought, focusing on India and the impact of British colonialism in that country using colonial media and technologies to spread colonialism. A broader clarification has been provided in Figure 1 to the effect of media technologies' interactions with capitalism and their embrace of colonial threads.

The trajectory of historical colonialism as studies show, tends to morph, fitting into the existential mode of production and targeting capital at a particular point in time, with slavery keying first into primitive capitalism (Anstey 1968; Ocheni and Nwankwo 2012), and colonialism feeding the productive needs of the industrial revolution (Benyera 2022; Berg and Hudson 2023). With the entry of digital capitalism, it can therefore be argued that since the 18th century, colonialism has been a determinant of the modes of production. Whether that which is associated with raw material and labour in plantation fields in the Americas and industrial revolutions in the West then, or the *unconscious* prosumer version currently linked to digitalization. Convincedly, both colonialism and modes of production are linked. In a sense, the influence of colonialism over two centuries now in whatever form and prism it is understood from, has been one of the most salient factors in whether a society catches up or falters with developmental goals. Some scholars like Acemoglu and Robinson (2017, 81) agree that there is a logic in which colonialism contributed to shaping "modern inequality in several fundamental, but heterogenous ways" such that, there is a constant divide in the supremacy of the means of production and the ensuing capitalism that emanates from such colonial activity.

For Africa, colonialism has different levels of impact, which Acemoglu and Robinson (2017) ascribed as the *heterogenous effects* of colonialism, where it ushered in some level of development for the colonizer and left negative economic consequences for the colonised. Thus, contemporary studies exploring colonialism, the fourth industrial revolution, digitalization and the ubiquitous corporate power of American Silicon Valley Big Tech companies locate a high degree of interrelationship and semblance with historical colonialism and today's digital capitalism (Benyera 2021; Couldry and Mejias 2019; Kwet 2019). Critically, since the turn of the century and the advancement of digital technologies, the debate over Western and American Big Tech companies' transposition of colonialism to digital coloniality has also gained tremendous currency. Van den Scott (2017) and Stingl (2016) chronicled this debate, arguing that, the digital space, beyond erecting enclaves and domains of inequality, extends the coloniality of power relations in the appropriation of human life for surplus capital and profiteering.

2.2. Facing Digital Capitalism as New Colonialism

The consideration of digital capitalism in contemporary colonialism and how Africa remains the whipping boy of the world – at the receiving end of global economic inequality signifies the repeat of history to an extent. The reason is not far-fetched. For more than a decade now, while other regions and continents are making frantic efforts to equalize power with Silicon Valley Big Techs, there has been no drive of sorts until recently when some autocratic African states dreaded the impact of social media networks on their autocratic power and rising opposition to their perpetuation in office beyond term limits that they began to beam their searchlights on social media Big Techs. In Nigeria for instance, it took X (Twitter) to delete then President Muhammadu

Buhari's genocidal Tweet on Biafra, before the government stepped in to tighten regulation of Silicon Valley Big Techs operating in the country (Anyim 2021; Ebim et al. 2022; Endong and Obi 2022; Reuters 2021). Conversely, the political economy dynamics remain in the mould of an ungoverned economic territory where most of the Big Techs now dominate Africa's digital space with all the agencies of capitalism and its *colonial* modes of production. This digital economic exploitation is not a one-way traffic, where foreign digital platforms extract resources – human life activities as labour and capital. There is also another layer of economic exploitation that comes with economic value, being that, while African states now collect taxes from the Big Techs, online citizens who engage in prosumption – *fun labour* are not afforded wages (see Figure 1 for further clarification). In both ways, there is a replica of capitalism and colonialism as well.

It is for this replication that digital capitalism is envisaged in the Global South, Africa specifically, as the new form of colonialism, where there are vast economic resources and extraction of human life of economic value like historical colonialism, fixated on human labour and annexation of large territories (Couldry and Mejias 2019). Even in the formal sector of the gig economy, as Anwar and Graham (2020) show, African workers still face a lack of autonomy and economic power bargain in many respects. These contradictions beyond their semblance with historical colonialism indicate the re-enactment of old colonial methods as new forms of colonialism, in which, Africa remains a focal point. Fuchs and Horak (2008) recognised that Africa is at the centre of geographical global inequality, and since technology is inversely linked to material wealth, and wealth production is a by-product of technology, Sub-Saharan Africa therefore deserves more than passive attention in the understanding of global digital capitalism and colonialism. The imperative of this call-to-action stems from the realities of Africa's victimhood in both historical and digital colonialism, currently expanded by the convergence of technology and prosumption. The nexus between technology, on the one hand, and digital prosumption, on the other hand, underscores what Schiwy et al. (2011) tagged the technology of global capitalism with continuities of colonialism as well.

3. Digital Labour and Prosumer Capitalism: Wither Africa?

The idea of digital labour or what is colloquially referred to as work has ignited several debates about its categorisation and classification for some time now. Dorschel (2022), for instance, considers such arguments on the classification of whether digital labourers should be categorised as gig workers, crowd workers, prosumers, or cyber proletariats as outdated, given that social scientists tend not only to situate such debates to the lower occupational strata of digital labour, but also leave what he termed a sociological blind spot on upscale gig workers. Fuchs (2014) also showed the different levels of digital labour by portraying how low-level workers from the Congo Democratic Republic, China, Cambodia, India etc. contribute to the production of digital and technological gadgets to mirror the pragmaticism of different layers of digital labour rather than the sole or overt concentration on social enquiry of the phenomenon. In this same journal, Fuchs and Sevignani (2013) further postulated the different digital dimensions of work ranging from *communicative work*, *cooperative work,* and *cognitive work,* arguing for the dichotomy between digital labour and work.

Notwithstanding the different debates on the categorisation of digital workers as cyber proletariats (Dyer-Witheford 2015; Huw 2001), the quantified worker (Ajunwa 2023), or underclass workers (Dawson 2002), other scholars insist on a broader uniformity in the classification of digital labour for both white-collar and low-level digital

workers (Dorchels 2022). In Africa, the focus is primarily on digital prosumer workers – the producers of data, that is sold to advertisers for capital and profits whether it is Google, Facebook, Twitter, Instagram or TikTok. This does not in any way downplay the place of other gig workers as Dorschel (2022) kicked against, but rather seeks to topicalise the pervasive nature of such *unpaid* labour in the digital space and how that evolves and feeds into prosumer capitalism in the continent. The lack of scholarly research on the African digital prosumer workers compels further exploration in that regard. Likewise, given the paucity of such research in this area, it has become critical to ascertain how digital labour and prosumption are fostered and negotiated in Nigeria, given that, digital labour has been envisaged as emblematic of future work (Berg et al. 2018).

Further, the categorisation of digital labour, the multi-layered markets, and the whole gamut of prosumption are at the centre of digital capitalism in a sense (Fuchs 2014; Papadimitropolous and Malamidis 2024; Ritzer 2015; Staab 2017), more so, within the African continent. This feeds into the conceptual frame of consumer capitalism within a larger scope. As Lewis (2013) posits, consumer capitalism operates with a sense of fluidity, inevitability, and also government-backed threads – there is therefore some relatability of consumer capitalism and prosumer capitalism within the digital space. Through digital prosumption, American-based Silicon Valley Big Techs often breach economic uniformity for cases of dichotomy as expounded in Figure 1, whereby, i) the Big Techs are aligned for greater capital accumulation (surplus capital) from the labour and consumption of citizens (prosumers); ii) the state attracts taxable income and economic benefits from the Big Techs as a result of prosumer activities; and iii) prosumers constitute the worst off – who laboured without pay and wages. However, within the political economy prism, prosumer labour in Africa can be distinguished from that of the West and even Asia, considering that, there are no economic safety nets nor social welfare systems to enable the redistribution of the taxable income derived from taxing Big Techs to the poor or prosumers. Even if the argument can be made that such taxable income could be railroaded to social safety nets for the benefit of the general population, the opaqueness of the system within the continent makes it intractable.

Overall, digital labour in Africa, whether as a gig working job or unpaid digital prosumption indicates vast cases of precarity, inequalities and vulnerabilities (Anwar 2022; Anwar and Graham 2022). Other observers like Ben Tarnoff further supported these thoughts, adding that, “an Internet dominated by profit motive is also an Internet that… intensifies various kinds of social inequalities” (Nelson 2023). Therefore, a critical examination of digital labour within the continent provides another view of extractive commodities with various layers of imbalance and contradictions. Some of these contradictions could be in what Wittel (2015) called *free labour* and other human productive activities outside the purview of wage-based commodification of labour. Wittel then submitted that more research should be dedicated to peer production and non-market production associated with digital prosumption. Yet, in a continent of more than 1 billion people, with about 570 million internet users (Statista 2023), the economic value of such a number of users has wider implications for global digital capitalism.

4. The Politics and Practices of Prosumer Capitalism: Negotiation and Exclusion in Nigerian Digital Spaces

The Nigerian economy with a Gross Domestic Product (GDP) of about $506 billion is the biggest economy in Africa: about 122 million people use the Internet and 31.6 million are Social Media users out of about 210 million population, which has remained

steady since 2017 (Statista 2023). According to Statcounter (2023), out of the 31.6 million social media users, Facebook account for 48.74%; Twitter 20.74%; Instagram 13.9%; YouTube 7.8%; Pinterest 7.7% and LinkedIn 0.53%. Facebook for example has about 21.8 million users; Twitter users X (Twitter) 5 million users (World Population Review 2023) among other social media networks. As a result of these statistics and millions of social media users in Nigeria, or what Oyedemi (2019, 2056) observed as "a burgeoning market for digital communication products", it can be adduced that a high percentage of citizens engage in prosumption activities, or what Fuchs (2014) described as *play labour*. This study categorised all labour activities without pay and wages in the form of prosumption as *fun labour*.

Estimates from the Nigerian Bureau of Statistics (NBS) indicate that the Information and Communication Technology (ICT) sector contributed about 18.44% to Nigeria's GDP (The Guardian 2022). According to TRT Africa (2023), American Silicon Valley social media platforms paid the Nigerian government about $1.3 billion between January 2022 to March 2023. Yet, there is obvious silence about digital labourers and prosumers in Nigeria who produce the User Generated Content (UGC) that is marketed to advertisers by Facebook, WhatsApp, X (Twitter), Instagram among others. While negotiations take place between Silicon Valley Big Techs and the Nigerian state (TRT Africa 2023) in view of tech tax, digital prosumers are left out of the equation, with only promises of enhancement of access to digital platforms for prosumption activities – production and consumption that aid the collation of users' data and extraction of human life. Just like it has been proven in Ghana and Kenya (Aljazeera 2017), Big Techs like Facebook have increased what Oyedemi (2019) called benevolent capitalism or philantrocapitalism by offering "Free Basics" – where users connect to the platform for free in Nigeria. This digital connection to Facebook offered to users has been found not for the improvement of digital equality and benefits, but for the enhancement of digital prosumption and data collection (Aljazeera 2017).

This practice has been followed with visits by Facebook's founder, Mark Zuckerberg, and X (Twitter) officials to Lagos, Nigeria's commercial capital and economic nerve centre and Africa's 11th economy (Heinrich Boll Stiftung 2015) and largest start-up capital (Weforum 2022) with pledges of supporting digital start-up in the country (Weetracker 2019; The Guardian 2018). Beneath these overtures, cases of data extraction, unpaid labour and other extractive activities are tilted toward data accumulation for profits and surplus capital, bolstering the economic-value agenda of the Big Techs – mostly, devoid of wages. Among the Silicon Valley Big Techs, X (Twitter) appears to be more sophisticated in the promotion of prosumer culture. In 2023, X announced that revenue derived from advertisements from content and data would be shared with the respective content creators and online influencers who created them (Reuters 2023). In Nigeria, for instance, this was followed by the payment to some Nigerian content creators and digital influencers in August 2023 (The Cable 2023). That Elon Musk could consider paying for online influence goes to explain the level of exploitation of digital capitalism over all these years. Surprisingly, in September 2023, Musk announced that users on the X platform would be charged a subscription fee (The Guardian 2023). In all, X gives users on its platform on the right hand, and takes back from the left hand, showing the intricacies of economic exploitation in the digital platforms. This phenomenon portrays the cases of digital capitalism in line with the economic value that Silicon Valley Big Techs attract in isolation of wages for the creators of content and prosumers. This often feeds into the broader web of prosumption and global digital capitalism.

Figure 1 below provides this segmentation within the realm of digital colonialism and prosumer capitalism. Here, Silicon Valley Big Techs such as Facebook, Instagram, and X (Twitter), but also TikTok deploy their platforms for data extraction, online production and consumption, as online users and content creators purchase data and engage in fun labour. For consolidation of such capitalist tendencies, the Big Techs adopt benevolent capitalism, philantrocapitalism, support for local start-ups or buy-over, frenzy visits by Big Techs chief executives, engaging with youth-friendly projects and provision of free basics. However, the state targets social media platforms and Big Techs for taxation; while online users and content creators generate the wealth, spend on data, and go without wages. The amalgam of these practices in prosumer capitalism and data accumulation and extraction pans out into the effect of Big Tech politics. In Big Tech politics, there is the establishment of state-corporate interrelationship, as the state becomes more reliant on Big Techs; Big Techs in turn side-step state control and overreach the state in several ways, and feed more from prosumer practices (Monsees et al. 2023; Srivastava 2021). Still, digital prosumers, online users and content creators remain isolated.

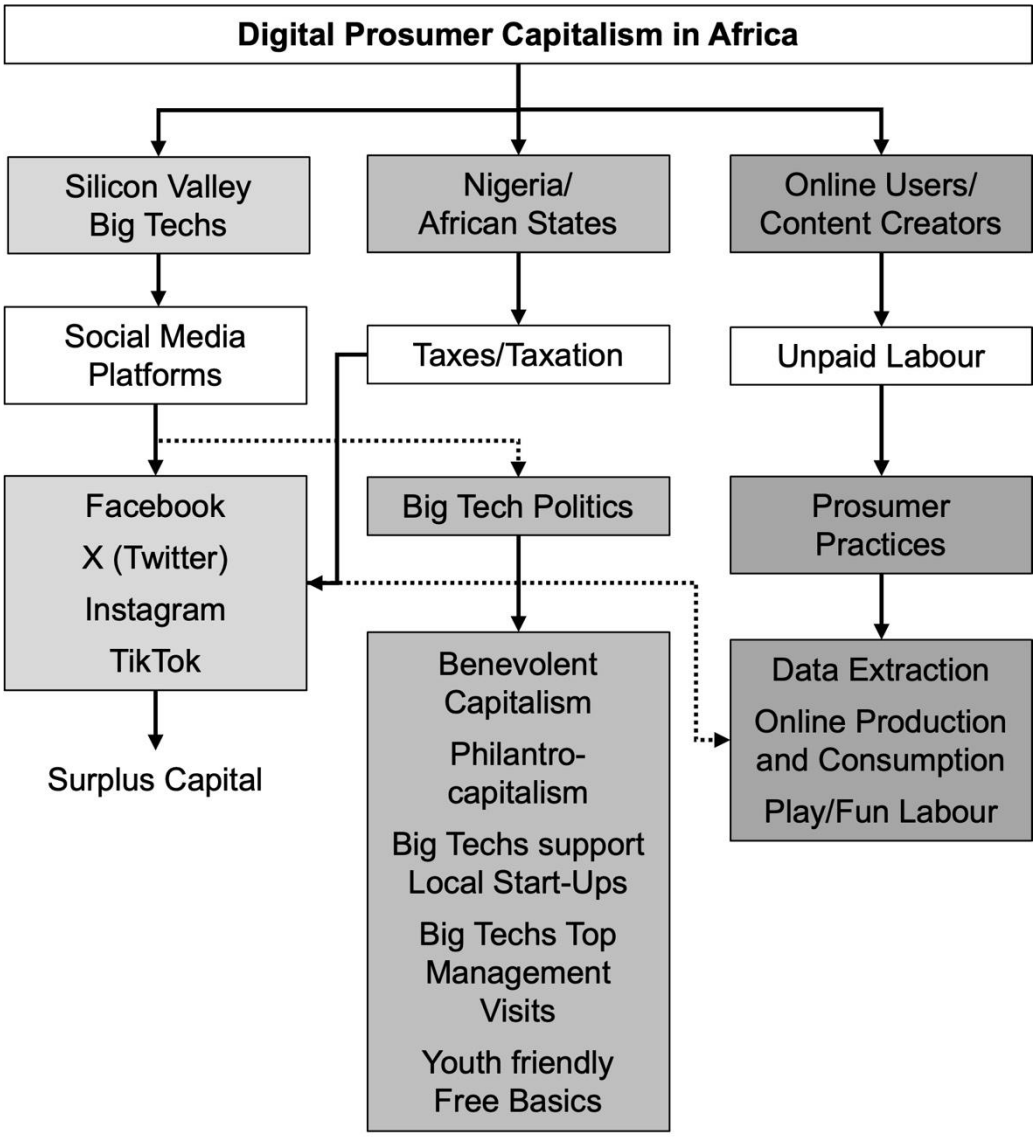

Figure 1: Digital Prosumer Capitalism in Africa

5. Conclusion

The propagation and expansion of digital capitalism, and its entrenchment through the frontiers of prosumer culture in the digital spaces remain key in the return of colonialism in today's African spaces. In some cases, the spread of social media platforms and the economic influence asserted by Silicon Valley Big Techs has been euphoric among Africans and even researchers with an understanding of the continent's digital world. The drive for extraction of data, targeting human life and the economic value attached to all these digital products have been downplayed extensively in research. This paper seeks to reignite that debate front and centre and push for more scholarly nuances in the field of African digital capitalism.

Therefore, this paper explores the degree to which the practices of digital labour, prosumption, data consumption and extraction of human life activities in the digital spaces reincarnate the nostalgic spirit of colonialism of old in Africa. It lays out the intersection of prosumer culture in the digital spaces, averring the disentanglement between capital – revenue generated from the economic value activities of Silicon Valley Big Techs on one hand and content creators, gig influencers, and prosumers who produce these digital products but go on without pay and wages. Though this paper does not completely fulfil the empirical research gap of African prosumers, particularly, in understanding their impulses on free and unpaid digital labour, it however, presents the practical and conceptual scope upon which digital economic inequalities within the realm of digital capitalism are fostered and entrenched in the continent, specifically, Nigeria.

Overall, the essence is to nudge this scholarly debate on digital capitalism further, bringing to bear the connection of digital labour, the economic-value chain therefrom prosumer culture, which is accumulated by Silicon Valley Big Techs to the complete neglect of material modes of production and attendant wages. The crux of this debate should therefore be centred on how Africa can (re)negotiate its path, not just for taxation purposes, but that which also profits the African digital prosumers. The paper therefore challenges other scholarly focus on global digital capitalism in Africa to spring from that materialistic gap associated with the negation of wages therefrom economic-value digital labour in the world of prosumer *vis-à-vis* digital capitalism.

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4. Democracy, Public Sphere and Digital Capitalism

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Railroad Luxemburg: Rosa Luxemburg's Theory of Infrastructure and its Consequences for a Public Service Internet

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Abstract: Infrastructures of circulation, transportation, and communication play a central role in Luxemburg's work in political economy as well as revolutionary strategy. This paper seeks to reconstruct and develop a theory of capitalist infrastructural expansion drawing from a variety of Luxemburg's writings. In *Accumulation of Capital*, infrastructural expansion – namely of railroads – plays a central role at all stages of capitalist accumulation. Railroads act as a site of military and state investment for introducing the commodity economy to non-capitalist sectors and eventually for the "capitalist emancipation of the hinterland." At the same time Luxemburg rejects the progressive character of these infrastructural endeavours, and she argues that they will not be a genuine "stamp of progress in an historical sense" until capitalism has been destroyed. It is no coincidence then that her political writings prominently feature figures such as railway and postal workers, who are strategically positioned to strike at the infrastructures of imperialism. A Luxemburgist theory of infrastructure has important relevance for contemporary debates around the expansion and ownership of Internet infrastructures. The past decade has been marked by various calls for new models of Internet ownership. These include The Public Service Internet Manifesto, the Democratic Socialists of America's Internet for All Campaign, Tarnoff's *Internet for the People*, Téwodros Workneh's "Case for Telecommunications Commons in Ethiopia," and netCommons Project's vision for community networks. Such calls for a publicly owned and funded Internet risk reproducing some of the dynamics Luxemburg describes in her account of the history of railroads, canals, telegraphs etc. Namely, such calls parallel the state subsidising of an infrastructure that seeks out new sites of accumulation and extraction. This is not to say that such endeavours should be wholly abandoned, but must fit into a broader anti-capitalist political program, otherwise such infrastructural expansion can be seen as continuing the expansion of capitalist accumulation. Luxemburg deters us from looking for a technical fix. For this reason, Luxemburg's political writings and her critique of the non-progressive nature of capitalism are also useful as she indicates how the destruction of capitalism can alter and redeem such large infrastructural projects.

Keywords: Rosa Luxemburg, infrastructure, Internet, railroads, circulation, forces of production

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1. Introduction

Over the past decade, there has been a proliferation of calls for rethinking and challenging the private ownership of the Internet's infrastructure. They include *The Public Service Internet Manifesto*, the New York City Democratic Socialists of America's "Internet for All" campaign, Ben Tarnoff's *Internet for the People*, Téwodros Workneh's "Case for telecommunications commons in Ethiopia," Cory Doctorow's *The Internet Con: How to Seize the Means of Computation*, and netCommons Project's vision for community networks. These are important and welcome initiatives for thinking about

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the power held by private corporations over critical means of communication and for charting futures where essential infrastructures do not serve the interests of capital.

Often what is not addressed centrally in these various calls for a publicly owned Internet is a reckoning with the deep imbrication of these infrastructures in colonial and imperialist projects. And while there is the implicit hope that an Internet in the hands of the public will move the Internet away from serving the project of empire, it is necessary to more explicitly parse out an understanding of the interrelationship between infrastructures of communication and imperialism, as state investment and public ownership of networked infrastructure have historically served the interests of capitalist expansion.

To address these questions there is no better thinker to turn to than Rosa Luxemburg. Throughout her most influential works – *The Accumulation of Capital*, *Junius Pamphlet*, and *The Mass Strike* – Luxemburg reckons with the role of networked infrastructures in imperialist expansion as well as in anticapitalist revolt. While her primary focus is on railroads (and occasionally canals, postal networks, etc.), I argue that we can generalise an infrastructural theory from Luxemburg which helps us think about contemporary debates about digital capitalism and ownership of Internet infrastructure.

In the chapter "Introduction: Breaking the Spell of Technicism" in *Outlines of a Critique of Technology*, Monika Reinfelder introduces Luxemburg as one of the earliest Marxists to "extricate themselves from technicism" (1980, 24). Reinfelder argues that Luxemburg rejected Lenin's "hymn to factory discipline as evidence of his mechanistic" thinking and dismissed "the idea of a technocentric continuum in the transition to socialism" (25). Along with her astute analysis of imperialism, Luxemburg's non-dogmatic approach to the question of technology and the forces of production make her thinking so relevant to the present.

To clarify a Luxemburgist theory of infrastructure, I turn to three critical interventions made across her corpus. First, in *The Accumulation of Capital*, Luxemburg points to the proliferation of railway construction in the 19th and 20th centuries as central to the historical conditions of accumulation. Looking at her discussion of the history of railways in the US and the Ottoman Empire helps us to better understand the roles of networked infrastructure in capitalism's ongoing expansion into non-capitalist zones. Second, in her *Junius Pamphlet*, Luxemburg makes an important intervention in thinking about the contradictory nature of the forces of production under capitalism. She argues, on the one hand, that technological development under imperialism had lost its claim to progress, while at the same time, these technologies could be brought into the service of humanity only in the context of a socialist revolution. Finally, in *Mass Strike*, Luxemburg's attention to the railway, telegraph, and postal workers' militancy in the 1905 Russian Revolution clarifies her thinking about the role of networked infrastructures and the workers that power them during times of revolutionary upheaval.

Once I have reconstructed Luxemburg's theory of infrastructure, the conclusion will return to contemporary questions about Internet infrastructure to show how Luxemburg's thought sheds important light on questions of digital capitalism. Luxemburg's writing about railroads can be broadened into a larger theory of networked infrastructure and can help us to understand infrastructure's relationship to capitalist accumulation and imperialism. This is useful for thinking about the expansion and ownership of the Internet among other communication networks and is also interesting in light of recent calls in the US for nationalising the railways (Lydersen 2023).

Before continuing, it is necessary to provide a brief note on terminology. Infrastructure is not a term that Luxemburg employed in her work. Instead, she often refers specifically to the technologies that today we think of as infrastructure, such as railways,

telegraph, and postal networks without referring to them with an umbrella term such as "infrastructure" or "technology." She will at times refer to "means" of transportation or communication. Within this paper, in order to draw out the relevance for twenty-first-century interests in questions of infrastructure, I use "infrastructure" – a term that Luxemburg herself didn't use – as an umbrella for means of transport and communication. I broadly conceive of "communication" as the flow of information, goods, people, etc. Further, by "infrastructure," I do not mean to invoke the use of the term as a stand-in for the term "base" in Marxist discussions of the relationship between the base and the superstructure. For instance, Louis Althusser in *Ideology and Ideological State Apparatuses* argues "that Marx conceived the structure of every society as constituted by 'levels' or 'instances' articulated by a specific determination: the *infrastructure*, or economic base (the 'unity' of the productive forces and the relations of production) and the *superstructure*, which itself contains two 'levels' or 'instances': the politico-legal (law and the State) and ideology (the different ideologies, religious, ethical, legal, political, etc.)" (Althusser 1971, 134). Christian Fuchs has analysed the problems of the Althusserian approach noting that "[t]he political and the cultural are economic and non-economic at the same time. But not only are culture and politics economic, the economic is also cultural and political. Althusser underestimates the operation of the non-economic in the economic realm" (Fuchs 2019, 7). While Luxemburg does tend to the conflict between forces of production and relations of production in her work, she also insists on the persistence of non-economic forms of coercion and violence by means of militarism, the state, and the law in imperialist expansion, which leads her to a significantly less rigid separation between the base and superstructure. As I argue below, for Luxemburg, large infrastructural projects, such as railways, are sites where not only forces and relations of production come into conflict but also are a site of state violence, where claims of cultural progress and other ideological battles are key.

Finally, what we understand today as infrastructure can be understood as a central component of what Marx called "the general conditions of production." Soren Mau notes: "Such projects require large investments of sunk capital and are usually too risky or unprofitable to be attractive for individual capitals. Infrastructure forms a part of what Marx called the general conditions of production, in contrast to the conditions of particular capitals or fractions of capital. Capital has to shift such burdens 'on to the shoulders of the state,' since the latter is the only institution that possesses 'the privilege and will to force the totality'" (Mau 2023, 276).

2. Infrastructure in Luxemburg's Theory of Accumulation

In *The Accumulation of Capital*, Luxemburg complicates Marx's account of expanded reproduction in *Capital Volume II*. Luxemburg argues that even in the abstract, capitalism cannot expand and reproduce itself in a world where only capitalists and workers exist. Capitalism always requires an outside, non-capitalist environment. For Luxemburg, "[a]ccumulation is more than an internal relationship between the branches of capitalist economy; it is primarily a relationship between capital and a non-capitalist environment" (Luxemburg 2003 [1913], 398).

So-called primitive accumulation, the securing of new regions for exploitation and the expropriation of lands and goods produced by non-waged workers is ongoing throughout capitalism for Luxemburg, not an isolated incident that simply served as a historical precondition of capitalism's emergence.[1] For Luxemburg extra-economic coercion and accumulation by expropriation persist alongside capitalist exploitation, and

[1] See for instance Roberts 2020, Harvey 2004, and Nichols 2021.

capitalism falls into crisis when it loses an outside from which to continue this plunder. As Luxemburg saw it, imperialism was a stage of capitalism where European capitalists had nearly exhausted their own internal non-capitalist areas and set out into the rest of the world to seek out new non-capitalist environments.

Railroads historically allowed capital to reach capitalism's outside, finding capitalists new non-capitalist spheres to tap into in order to find new workers, consumers, land, and goods to expropriate. Luxemburg asserts that:

> "The forward-thrusts of capital are approximately reflected in the development of the railway network […] Public loans for railroad building and armaments accompany all stages of the accumulation of capital: the introduction of commodity economy, industrialisation of countries, capitalist revolutionization of agriculture as well as the emancipation of young capitalist states" (Luxemburg 2003 [1913], 400).

Railroads, both as a means of circulation and movement, but also as a large-scale infrastructure that served as a vessel for massive loans and investment, were a pivotal part of the historical conditions for capitalist accumulation. This is not a technological determinist argument, but rather based on Luxemburg's historical analysis of the nineteenth century where railroads "grew most quickly in Europe during the forties, in America in the fifties, in Asia in the sixties, in Australia during the seventies and eighties, and during the nineties in Africa" (Luxemburg 2003 [1913], 400).

To illustrate her point, Luxemburg examines three historical examples of imperialist railroad development under capitalism: the role of the railroad in North American westward expansion, British loans for railway constructions throughout the Americas, and lastly German loans to the Ottoman Empire. The example of the US and Canada serves to elucidate the role of railways in the struggle against the peasant economy and the separation of "industry from agriculture, to eradicate rural industries altogether from peasant economy" (375). Whereas the example of loans to the Ottoman Empire for railway construction demonstrates how the promise of modernization through large-scale infrastructure projects unevenly incorporated countries like the Ottoman Empire, Russia, China, and Egypt into the capitalist world system as debtor nations. Railways were for Luxemburg not simply tentacles of empire in the sense that they connected various parts of the earth – although this point is important. They also served as important sites of state and private capital investment, helping capital in the imperial core attract states eager to indebt themselves and purchase the materials for modernising their transportation and communication systems.

2.1. Railroads and the American Frontier

> "In the wake of the railways, financed by European and in particular British capital, the American farmer crossed the Union from East to West and in his progress over vast areas killed off the Red Indians with fire-arms and bloodhounds, liquor and venereal disease, pushing the survivors to the West, in order to appropriate the land they had 'vacated', to clear it and bring it under the plough" (Luxemburg 2003 [1913], 376).

Luxemburg points to nineteenth century railroads along the American frontier which lured European settlers with the promise of escaping the capitalist drudgery of British factories or factories setting up on the east coast of the US Railroad companies – equipped with large land concessions and subsidies from the state – advertised vibrant

farmlands along the railways for settlers to move out and become farmers. But once settlers moved out and became farmers, they were quickly outpaced by monopolist farm companies – that were often owned by the same people who owned the railways. This then forced the farmers to abandon an idyllic, self-sustaining farm life and begin again, working for a wage. Along the American frontier, what accompanied the violent dispossession of Indigenous people and land was a constant process of recreating the dynamics of enclosure, encouraging settlers to engage in simple commodity production which was quickly extinguished by industrial capital. The promise of escape from capitalist drudgery was necessary for capitalism's continual existence and expansion, capital needed farmers who were not quite wage labourers to then re-incorporate into the wage system. Capital was in a constant process of re-creation and re-discovery of an outside. As Luxemburg puts it: "capital cannot accumulate without the aid of non-capitalist organisations, nor, on the other hand, can it tolerate their continued existence side by side with itself. Only the continuous and progressive disintegration of non-capitalist organisations makes accumulation of capital possible" (397).

Drawing from the insights of Luxemburg as well as John Hobson and Vladimir Lenin's writings on imperialism, Manu Karuka develops the concept of "railroad colonialism" in his book *Empire's Tracks*. His account is much more attentive to the impact of imperialist expansion on Indigenous people in North America than Luxemburg's account, which is much more focused on the settler perspective. On the concept of "railroad colonialism" Karuka writes:

> "Infrastructure, in other words, played a police function, materialising not through liberal universalism, but proliferating distinctions and comparison along the lines of community, nation, race, gender, caste, and respectability. Railways enabled the circulation of colonial commodities throughout the imperial core, and even more importantly, they made the large-scale export of financial and industrial capital to the colonies a central feature of global capitalism" (Karuka 2019, 40).

Karuka's concept of the war-finance nexus is additionally useful for understanding the interrelationship between the state (both as a lawmaker and military enforcer) and the boom of financial capitalism that funded railroad expansion. In this nexus, it is hard, if not impossible to separate the work done by the state and by private companies. They give each other legitimacy, and this is especially clear in the case of railroad companies leading the way in colonial expansion with the state's authorization. In his discussion of railroad companies, he writes "Corporations transformed, from extensions of state power for establishing sovereignty, into sanctuaries from state power for the accumulation of capital" (164). For Karuka, "[r]ailroad colonialism was central to the co-constitutions of the modern imperial state and finance capitalism, in the latter half of the nineteenth century" (xiv).

2.2. Ottoman Railways & Debt Colonialism

Another example Luxemburg gives of the role of railroads in imperialist expansion is how German loans underwrote the Ottoman Empire's construction of major railways from the 1880s onwards. These German loans were used to buy German locomotives, railcars, and other technology along with German steel for the construction of the Ottoman railway. Luxemburg writes that in the 1890s and 1900s, "German capital was used to a considerable extent to pay for German goods, the Germans forgoing, to use Sismondi's term, only the pleasure of using their own products" (Luxemburg 2003

[1913], 407). For contemporary economists, this process seemed plainly absurd and counter to the economic interests of German capitalists as German money was being used to buy German goods.

Luxemburg argues that this appearance of absurdity actually made economic sense for German capital, which, facing a saturated domestic market, sought out the Ottoman Empire as a new market to expand into. What mattered was not domestic consumption but rather finding new sites to "beget and realise surplus value, so that accumulation can proceed" (408). Luxemburg details how, through an elaborate chain of Ottoman tax administrators, this major industrial project was ultimately funded by the direct expropriation of Ottoman peasants whose goods were seized by the Ottoman state and sold to pay debts to Western Europe. Here, so-called capitalist emancipation and modernization were paid for by the non-capitalist peasants rather than for by wage labourers; "large regions of natural economy are open to conversion into commodity economy, or existing commodity economy can be ousted by capital" (408). Through a "complicated metamorphoses" grain produced by peasant farmers was expropriated and passed through the hands of various tax collectors ultimately ending up in the hands of the Administration de la Dette Publique Ottomane, an entity owned and operated by Germany and other European countries that served the purpose of collecting debt payments (424). Luxemburg characterises this relationship bluntly as

> "a coarse and straightforward metabolism between European capital and Asiatic peasant economy, with the Turkish state reduced to its real role, that of a political machinery for exploiting peasant economy for capitalist purposes, – the real function..of all Oriental states in the period of capitalist imperialism […] Germans allowing the shrewd Turks merely the 'use' of their great works of civilisation – it is at bottom an exchange between German capital and Asiatic peasant economy, an exchange performed under state compulsion. On the one hand it makes for progressive accumulation and expanding 'spheres of interest' as a pretext for further political and economic expansion of German capital in Turkey. Railroad building and commodity exchange, on the other hand, are fostered by the state on the basis of a rapid disintegration, ruin and exploitation of Asiatic peasant economy in the course of which the Turkish state becomes more and more dependent on European capital, politically as well as financially" (424).

Luxemburg argues that this supposed "capitalist emancipation" of the Ottoman Empire, a capitalist hinterland, further entrenched a relationship of subordination to European capitalists (399). The creditor-debtor relationship between Germany and the Ottoman Empire served as the grounds for "further political and economic expansion of German capital in Turkey" as the disintegration of the Turkish peasant economy and the building of railroads created a dynamic where the "Turkish state becomes more and more dependent on European capital, politically as well as financially" (424). Luxemburg clarifies this contradictory dynamic of capitalism's imperialist phase wherein, on the one hand, the development of railways and other infrastructural projects create greater competition between Western European powers and on the other hand, these foreign loans are also the means by "which the old capitalist states maintain their influence, exercise financial control and exert pressure on the customs, foreign and commercial policy of the young capitalist states" (401).

2.2.1. The Promise of Infrastructure

In Luxemburg's discussion of the Ottoman Empire, she is criticising the ruse of capitalist emancipation. While the construction of high-tech railways was seen as a way to modernise the Ottoman Empire, and bring it into competition with capitalist Western Europe, its incorporation through loans and foreign imports further entrenched its subordinate position in the capitalist world system. We can see in Luxemburg a critique of "capitalism's teleology of perpetual expansion" (Menozzi 2018, 7).

Additionally, we can read Luxemburg as an early thinker of what in critical infrastructure studies is referred to as the "promise of infrastructure". Hannah Appel, Nikhil Anand, and Akhil Gupta in the introduction to *The Promise of Infrastructure* describe how infrastructures "including roads and water pipes, electricity lines and ports, oil pipelines and sewage systems […] have long promised modernity, development, progress, and freedom to people all over the world;" yet with this promise of connectivity, circulation, distribution, and modernity, infrastructures are also "critical locations'' of "accumulation and dispossession" (Appel 2018, 3). Infrastructures hold a certain purchase on our imagination about bringing forth a better future, yet Anand, et. Al. remind us that often this promise also involves the "poisoned promise of economic growth" (27). In Luxemburg's account, railways put forward a certain promise to the agrarian settlers on the western frontier and to the Ottoman Emperor of political and economic emancipation, progress, and modernization. Yet her critical analysis shows the ruse of such a promise, a ruse that is still operational today when thinking about networked infrastructures. Additionally, in situating infrastructure in the historical progression of capitalist expansion, Luxemburg provides a strong rejoinder to those in STS who might be seduced by arguments about the agency of non-human actors, reminding us that non-human objects such as railways are sites of struggle between human actors and social forces.

3. *Junius Pamphlet* & Capitalist Technology's Stamp of Progress

In her discussion of railroads and other infrastructure, Luxemburg explicitly deals with the often-discussed contradiction between the forces of production and the relations of production. In the preface to *Contribution to the Critique of Political Economy*, Marx described this contradiction as a direct conflict between the two, whereby "at a certain stage of development, the material productive forces of society come into conflict with the existing relations of production" (Marx 1859, 263). This conflict arises when relations of production turn into the "fetters" of the "development of the productive forces" which are also the source of the material conditions for the "solution" of this antagonism (263). Capitalism's revolutionising of the technologies and techniques of production outpace the social relations of the capitalist mode of production and creates the conditions for revolution and a solution to this contradiction.

Luxemburg complicates this understanding of the role of the forces of production in resolving this antagonism. She argues that in capitalism's imperialist phase, the forces of production themselves – and not just the relations of production, i.e., the private ownership of the means of production – at a certain point cease to be progressive. She sees within the development of these progressive technologies the simultaneous development of tools of mass misery and what she would call the barbarism of imperialism. Throughout her writing, one encounters what seem like contradictory assessments of the development of technologies under capitalism. What these contradictory statements capture is the existing contradiction within capitalism, whose resolution is

a deadly serious matter, hence her famous formula: socialism or barbarism. This allows Luxemburg sometimes to assert that "[c]apitalism, by mightily furthering the development of the productive forces, and in virtue of its inherent contradictions. . . provide(s) an excellent soil for the historical progress of society towards new economic and social forms'' while elsewhere asserting that "[n]o medicinal herbs can grow in the dirt of capitalist society which can help cure capitalist anarchy" (Geras 1973 quoting Luxemburg, 17)[2].

As it relates to a discussion of railroads, Luxemburg's analysis of the layered contradictions between forces and relations of production during capitalism's imperialist phase is most clear in her *Junius Pamphlet*. In the *Junius Pamphlet*, Luxemburg is primarily critiquing much of the left's response to WWI. What is particularly interesting in this pamphlet is the way that she breaks with some strains of Marxists who seem to be boundlessly optimistic about capitalism's ability to produce technological progress and revolutionise the forces of production. Luxemburg agrees with other Marxists who point to the contradiction between capitalist technology and forces of production as progressive and capitalist relations of production (bourgeois ownership of means of production) as oppressive, but argues that this progressive tendency of technology eventually loses steam.

Luxemburg argues that the brutality of capitalism's imperialist phase which was necessary to bring these technologies to the non-European world undercut any progressive claim on these technologies. She argues against capitalist economists who would point to the expansion of "railroads, matches, sewerage systems and warehouses" as emblematic of the spread of "progress and culture" (Luxemburg 1915, 338). She instead insists that these infrastructural projects are "neither culture nor progress, for they are too dearly paid for with the sudden economic and cultural ruin of the peoples who must drink down the bitter cup of misery and horror of two social orders, of traditional agricultural landlordism, of super-modern, super-refined capitalist exploitation, at one and the same time" (339). She goes further arguing that WWI is a turning inward or boomeranging of imperialist brutality onto Europe itself. WWI for Luxemburg marked "a turning point in the course of imperialism. For the first time the destructive beasts that have been loosed by capitalist Europe over all other parts of the world have sprung with one awful leap, into the midst of the European nations" (339).

Luxemburg writes that under imperialism, capitalism's triumphant technological and infrastructural advancements cease to "bear the stamp of progress in an historical sense" (Luxemburg 1915, 339). But nevertheless, she maintains that communications technologies have a revolutionary potential in their capacities for international connectivity and the building of a truly internationalist socialist future. She asserts that "historic development moves in contradictions," and that the destructive forces of imperialism brought about its opposite, the possibility of "overthrow by the proletarian international" (338). Likewise, the use of modern infrastructures towards devastating destructive ends has brought about the opposite potential for the reconfiguration of the world and its infrastructures towards the cause of human emancipation. Luxemburg polemicized that the brutal imperialist phase with its expansion of infrastructures "has created the premises for its own final overthrow" (338). The "only cultural and progressive aspect of the great so-called works of culture" is their potential redemption as "the material conditions for the destruction of capitalism and the abolition of class society" (338). By further interconnecting the world, capitalism and its networked infrastructure created the conditions for thinking revolution on the world scale. Only under these conditions

[2] The thinking in this paragraph is indebted to Geras' 1973 *NLR* article.

will the enormous infrastructural projects “bear the stamp of progress in an historical sense” (339).

Under imperialism, capitalism has lost its progressive character, it has revealed itself for its inhumanity both within and beyond Europe. Technological advances revealed themselves to be crucial equipment for imperialism’s inhumanity. Here Luxemburg resists any technological determinism that would see the forces of production as always having a progressive character in the face of the relations of production. The inhumane relations of production of capitalism in its imperialist phase undermine capitalist technology which ends up serving the ends of destruction. In the *Junius Pamphlet*, Luxemburg complicates a forces of production determinism without precluding the possibility of recuperating these technologies.

4. Railway, Telegraph, and Postal Workers in the 1905 Russian Revolution

In *The Mass Strike, the Political Party and the Trade Unions*, Luxemburg argues that political parties or union bureaucracy are unable to call a revolution into action; she argues there is a degree of worker self-activation that cannot be calculated or dictated from above or without. To make this argument she looks at the 1905 Russian Revolution, and argues that while there were small labour mobilizations that sparked the revolution, these mobilizations gave way to more generalised mass strikes and political revolution. The narrow economic demands of the labour union then fuelled a larger political horizon.

Luxemburg describes the specific labour struggles such as “the conflict of the railwaymen with the management over the pension fund” as “a partial conflict” and “subordinate and apparently accidental things” which subsequently gave way to the “general rising of the industrial proletariat” (1906, 189). What is interesting for the present essay is the specificity of these subordinate and accidental mobilizations. As incidental as she makes them out to be, most of these labour strikes were done by railway, telegraph, and postal workers. Russia had recently rapidly industrialised and grown its railways through Western European loans in a similar fashion to the Ottoman Empire case discussed above. Tsar Nicholas II, under the guidance of his finance minister Sergei Witte, undertook dramatic projects of national industrialization which “involved heavy government expenditures for railroad building and operation; subsidies and supporting services for private industrialists; high protective tariffs for Russian industries […]; increased exports; stable currency; and encouragement of foreign investments. Government expenditures to spur industrialization were paid for with stepped-up regressive indirect taxes on articles of mass consumption, and by foreign loans” (Skocpol 1979, 91). This “state-guided capitalist development” led to dramatic industrialization with railroad mileage growing by 40 percent between 1892 and 1902 (91). Foreign loans from Western Europe played an important role in securing the materials necessary for this industrialization and to pay for these loans the government doubled its tax income and “agricultural ‘surpluses’ were squeezed from the peasants and marketed abroad to finance purchases of foreign technology and to maintain the balance of payment” (91). Like the other cases that Luxemburg studied, the building out of railroads in Russia was ultimately paid for not by the surplus value of wage labourers, but by direct expropriation from peasants. All of this exacerbated social tensions and rapidly created a displaced and oppressed peasantry as well as a new rapidly formed industrial proletariat concentrated in cities like St Petersburg and Moscow. This quickly created an urban proletariat of railway workers as well as an indignant peasantry who had their goods expropriated from them by the state to pay for the loans from Western

Europe. Railways were then not incidental but very much emblematic of the existing economic and political issues that were upsetting Russians.

The “subordinate and apparently accidental” labour mobilizations were significant insofar as they were microcosms of the broader political and social context against which Russians were revolting (Luxemburg 1906, 189). Luxemburg asserts that it is impossible to separate political and economic dimensions. Mass strike flows from the narrow economic struggle of workers, often railroad or telegraph workers, and then is generalised into a political strike which then becomes massified and economic again. The workplace struggles of the railway, postal, and telegraph workers for Luxemburg were a "small scale" version of the "entire history of Russian mass strike" (194). These narrow struggles are ones “out of which political conflicts on a large scale unexpectedly explode” (195). Here again we see Luxemburg resisting an all too easy technological determinism. While the Russian Empire’s infrastructural undertakings were a clear site of social disruption and a prime target for a revolutionary offensive, Luxemburg refused the possibility of predicting the unfolding of history.

Russia’s recent expansion of its railway networks and the subsequent social disruption and reconstitution shaped the terrain of struggle placing railway workers in prime positions to strike at networked infrastructures of capital and the state. Furthermore, the centrality of networks in the 1905 Russian Revolution made it into the very language used by Luxemburg in her analysis. In theorising the relationship between economic and political struggles, Luxemburg uses the spatial language of networked feedback. She writes:

> “In a word, the economic struggle is the *transmitter* from one political ce*ntre to another*; the political struggle is the periodic fertilisation of the soil for the economic struggle. Cause and effect here continually change places; and thus the economic and the political factor […] form the two interlacing sides of the proletarian class struggle in Russia. And their unity is precisely the mass strike” (Luxemburg 1906, 195, emphasis added).

Here Luxemburg is theorising the relationship between economic struggles – the narrow demands of the striking railway workers for things like a better pension – and the broader political struggle for revolution. Her use of the concept of transmission from one centre to another to describe strikes and sabotaging by rail and telegraph workers evokes the images of the networks themselves that were being disrupted.

In the 1905 Russian revolution, networked infrastructures like railways which had so radically disrupted Russian society in the preceding decades by means of the “brutal triumphant procession of capitalism through the world” became the site of intense political and economic struggle, and provided a glimpse of these same technologies functioning in the service of human emancipation (Luxemburg 1915, 338).

5. Luxemburg’s Theory of Infrastructure and its Implications for Contemporary Movements for Public Ownership of the Internet

To summarise, for Luxemburg networked infrastructures like railways open up and help capital expand into new non-capitalist sectors. While promising escape or access into capitalism’s outside –escape from the drudgery of wage labour, or, access to non-capitalist regions and new areas of investment, enclosure, and privatisation –Luxemburg teaches us that capitalism always requires a non-capitalist outside to expand into and plunder. Railways and other networked infrastructure are thus crucial for capitalism’s maintenance and resolution of crises. On the one hand, there is the promise of

escape into the outside, while also serving as a prime mechanism for the capture, integration, and subsumption of new sites of extraction. Additionally in Luxemburg we see an insistence on the brutality and non-progressive nature of these infrastructures in capitalism's imperialist phase, but also a vision of these technologies as an important site of political struggle that can be put to the service of human emancipation in a post-capitalist future. That is to say a rejection of a technicism or technological determination, and close attention to the relationship between the relations of production and technology.

Given Luxemburg's understanding of accumulation as not happening strictly internally to capitalism, but as a dynamic process both within and without, it is no surprise that railway workers would be such an important and appealing political figure for her to turn to. Railways as discussed throughout this paper were central for linking capitalism's inside and outside in the processes of production, consumption, distribution, and exchange. Railway workers sit on a pivotal infrastructure that can both shut down capitalist accumulation and potentially transform these networks in the name of human emancipation.

In Luxemburg's theory of infrastructural expansion, we can see an early, decidedly materialist elaboration of what infrastructure studies scholars call the "promise of infrastructure." In Luxemburg's description of railroads in *The Accumulation of Capital,* there is always some sort of promise of escape or of moving out of one's current situation. This was the case for the European settlers in the Americas, who saw the westbound railways as a way to escape enclosure and proletarianization in the UK and on the east coast of the US. It was also the case for countries like Turkey, Egypt, and Russia who saw the building of railways as a means to escape subordinate positions in global politics and economy and enter into inter-imperialist competition with Western Europe. In all of these instances, massive infrastructure projects provided hope and promise of moving outside or beyond a certain realm of capitalist domination. These communications networks also provided a site for the investment of surplus credit. However, Luxemburg's theory of accumulation teaches us that this outside itself is central to the maintenance of capitalism. Railways and other infrastructural projects act as networks that open onto new sites of circulation, extraction, and accumulation. These lessons are ever important today as alternatives to privately owned Internet infrastructure are being put forward around the world.

Many scholars have accounted for how the expansion of Internet infrastructure serves imperialist tendencies of capital to seek out new, untapped sites of extraction and accumulation.[3] Already in 2004, Y.Z. Ya'u asserted in *The Review of African Political Economy* that "current international attempts at bridging the digital divide are part of wider efforts to not only secure the virgin markets of developing countries, but also to configure the world in the interest of the new imperial powers" (11). Here Ya'u is speaking specifically of the context of neoliberal breakup of state telecommunications monopolies and the takeover of African Internet infrastructure by multinational corporations. But the securing of virgin markets and seeking out new sites of accumulation by the expansion of Internet infrastructure can hold true even in the case of a publicly owned infrastructure, so long as capitalism is left intact. Luxemburg's corpus provides us with plenty of examples where state-funded infrastructure projects proceed in lockstep with the interests of capital.

[3] See for instance Duarte 2017, Greene 2022, and Aouragh and Chakravartty 2016.

In *Internet for the People*, Ben Tarnoff gives us a terrific history of the Internet's journey from a publicly funded endeavour to a privatised, enclosed commercial infrastructure. He makes a compelling argument for the de-commodification of the Internet and the transformation of it into a public utility run, returning it to the hands of the state and the public. What Tarnoff does not tend to closely enough throughout his articulation of a politics of returning the Internet to its status as a public utility is what, exactly, this return entails. The book begins with a clear-eyed discussion of the military origins of the networking protocols that would become the Internet. Tarnoff is clear in outlining how the Department of Defense spent so much public money on developing Internetworking with its eyes on defeating communist, anti-imperialist struggles in Vietnam. While Tarnoff does not shy away from this history of the Internet which married public ownership with capitalist imperialism, he perhaps falls into the trap of technological optimism when it comes to thinking about the tension between the destructive and progressive dimensions of technological development under capitalism. For Tarnoff, the Internet was a machinery of warfare, but it was also a machinery with a promise of state-led public communication and participation. And the *Internet for the People* charts out a compelling path for how to return the Internet to a state of public ownership. However, in light of Luxemburg's infrastructural thinking, it falls short in tending to the ways that the capitalist state can and has played a vital role in expanding the infrastructures of empire.

Returning to Luxemburg's writing on railroads in *Accumulation of Capital* and the *Junius Pamphlet* here is instructive. In observing the ways that the promise of development is doled out to the "noncapitalist" sectors of the world, taking her instance of Egypt or the Ottoman Empire, she demystifies some of the progressive character of capitalist development that other Marxists are enchanted by. The building of canals in Egypt, and the construction of railways in the Ottoman Empire, were actually not creating conditions for expansion of capitalism in the sense of bringing in new people into a proletarian, wage-labour class. Instead, these technologies disrupted the production of the crops they claimed to be helping, sunk these countries into massive debt to European creditor countries, and ultimately the surplus value that was extracted through these ventures came from peasant classes whose land and goods were expropriated. In these moments of infrastructural expansion, accumulation proceeded by means of dispossession rather than by means of exploitation and state-funded infrastructure projects were a central component. So long as capitalism continues to expand and cannibalise the non-capitalist sectors, these technologies do not even fulfil the promise of bringing about a bourgeois revolution, i.e. of subsuming more of the world into wage relations. Thinking with Luxemburg, we can see how the railroads do not represent an expanding international proletariat but instead represent the continued plundering of peasants throughout the Global South who become the collateral for the loan that funded the infrastructural build-out. So, when we are tempted to look to the past for a golden period when the Internet was funded by the state and not for profit-seeking, we need to be cautious. The Internet was always an instrument of accumulation even when it was mostly owned and managed by the state.

Authors such as Nick Couldry and Ulises Mejias (2019) have put forward an argument that a critique of colonialism must be central to our contemporary understandings of digital capitalism. They argue in *The Costs of Connection* that while "historical colonialism annexed territories, their resources, and the bodies that worked on them, data colonialism's power grab is both simpler and deeper: the capture and control of human life itself through appropriating the data that can be extracted from it for profit" (Couldry and Mejias 2019, xi). While correctly identifying the datafication of human life as a new

site of dispossession, what the legacy of Luxemburg adds to this analysis is that the same infrastructures that permit "data colonialism" also continue many of the dynamics of "historical colonialism," which is not historical but an ongoing project; or in the famous formulation of Patrick Wolfe, it is "a structure rather than an event, its history does not stop" (Wolfe 2006, 402).

Luxemburg, when read as a theorist of technology and infrastructure, can be understood as a sort of predecessor of critical positions in the philosophy of technology taken up by thinkers like Bernard Stiegler and Herbert Marcuse who reveal technology as a site of political struggle. These thinkers, like Luxemburg, teach us that you cannot simply take control of technology built in the service of human domination without first understanding and confronting these harmful logics. Marcuse in developing the concept of technological rationality provided us with the insight that technologies of industrial capitalism have shaped rationality even at the individual level, turning it against the interests of human emancipation. In critiquing technological rationality and the substitution of logics of efficiency for rational behaviour, Marcuse argues that the very idea of "protest and liberation appear not only as hopeless but utterly irrational" (Marcuse 1941, 145). Modern technology for Marcuse ushered in an era where the "prevailing type of individual is no longer capable of seizing the fateful moment which constitutes his freedom" and has moved away from a capacity for "resistance and autonomy" (152). Rediscovering the capacity for such autonomy and emancipation then are central to a socialist political project in the face of modern technologies. First written in 1941, Marcuse's (1941) "Some Social Implications of Modern Technology' can be seen as an update of Luxemburg's *Junius Pamphlet* in light of the Third Reich's mobilisation of industrial technologies towards genocidal ends. Bernard Stiegler and the Internation Collective in the introduction to *Bifurcate* take aim at the twenty-first century "developmental model" characterised by "accountancy directives in the age of algorithms" and "technology of calculability" (Stiegler 2021, 16). They assert that "this developmental model is in reality a model of destruction – and this destruction, long regarded as 'creative', has been accomplished over the past two decades through the global civil war now being waged with the computational weapons of mass destruction that arise with reticular and disruptive innovation" (Stiegler 2021, 14). Here we can see Stiegler and the Internation Collective providing an update to Luxemburg's critique of capitalist technological progress, arguing that what such progress and development represent is their opposite: barbarism and destruction.

While Luxemburg struggled during her lifetime for a future where infrastructures of empire could be repurposed in the service of world socialist revolution, she provided little by way of prescription of what a socialist use of infrastructure ought to look like. The tripleC issue on "Communicative Socialism/Digital Socialism" (Fuchs 2020) provides glimpses of what an emancipated use of technology could look like. We might also look to past efforts such as Eden Medina's chronicling of Salvador Allende's socialist government's Project Cybersyn. The hazards of the politics of networked infrastructure can be seen in the counterrevolutionary government of Augusto Pinochet which subsequently employed computer technology provided by Washington "as part of its larger campaign to 'modernize' and 'professionalize'" intelligence agencies of US-backed right-wing dictatorships in Latin America (Grandin 2014).

Railroads, like Internet cables and other communication networks, ensure a persistence of an outside even in times when it seems like most of the world's geography has been incorporated into capitalism. These networks in some ways add an additional layer to the map of territorial expansion. This can be seen for instance in the discussions of the politics of the allocation of radio spectrum and satellite orbit slots. Both the

electromagnetic spectrum and outer space are twentieth century discoveries that in turn became sites of commercial and state expansion and means of communication. In the past twenty years or so, there has been a criticism of the "enclosure" of the electromagnetic spectrum commons, and similarly a critique of the privatisation of space. The gradual employment of metaphors of land and property to the intangible electromagnetic spectrum and the rise of ownership regimes and auctions of radio frequencies can be understood as the creation and subsumption of the sort of non-capitalist outside that Luxemburg is so attentive to in *Accumulation of Capital*[4]*.* Similarly, the ongoing political and legal debate about outer space as a "global commons" and the increasing use of orbital space for private ends, such as by the Starlink company present another frontier of the ongoing enclosure (Pic et al. 2023).

Luxemburg's contribution to our thinking of networked infrastructure along with her important assertion of the persistence of dynamics of primitive accumulation, expropriation, and extra-economic violence speak to contemporary debates over the question of "digital feudalism" taken up by people like McKenzie Wark, Evgeny Morozov, and others. In *Capital is Dead*, Wark makes the case for updating our analysis of class relations, arguing that "maybe now there's another kind of ruling class" in addition to the landlord and capitalist class that "owns neither [land nor factory][...]but instead owns the vector along which information is gathered and used" (Wark 2019, 4). Wark's vectorialist class wields power by controlling information and the infrastructure for this information's circulation. Morozov takes aim at recent trends in Marxism that argue that transformations in the means and relations of production in light of the ascent of networked information technology have brought us to something different than capitalism. He lumps in Wark with thinkers like Cederic Durand and Yanis Varoufakis who argue that rather than the capitalist mode of production dominating, we now see the primacy of techno-feudalism. Morozov invokes Luxemburg in his critique of this position, pointing to Luxemburg's argument that under capitalism, "exploitation and expropriation have been – and still are – mutually constitutive" (Morozov 2022, 102). This understanding pushes back against those who argue that we are moving in "the direction of the feudal logic of rent and dispossession, rather than the capitalist logic of profit and exploitation" (Morozov 2022, 107). By understanding Luxemburg's writing on the dynamics of the networked infrastructure of her time as functioning similarly to those of digital Infrastructure, we can read into Luxemburg an anticipatory critique of the techno-feudalism argument. While Wark is not the primary target of Morozov, his argument might not apply to her position. Despite the provocative title of her book, Wark is emphatic that "modes of production are multiple and overlapping" (Wark 2019, 14) and that her investigation into the vectorialist class asks "if an additional [class] is emerging, not whether it describes the totality" (7). Understood as such, we might see Luxemburg's theory of infrastructure as complementary to both Morozov and Wark's position as all three recognise that the success of the capitalist class is contingent on domination by other classes. Furthermore, Luxemburg's focus on struggles over means of communication and transport in her political writing suggests that she, like Wark, saw networked infrastructure as a new site of imperialist power that was just as important to investigate as the factory.

6. Conclusion

So long as we live under capitalism, infrastructure serves the purpose of rooting out new sites of accumulation. We can see this in the Internet as bringing new people

[4] See for instance Streeter 1996 and O'Dwyer 2013.

online intensifies demands for energy and rare minerals for ICTs and other electronics, which are attained by means of child and slave labour and are also leading to the opening of new sites of extraction along what Julie Klinger calls the "the rare earth frontier". One can see Norway's recent announcements of plans to commence deep sea mining in the Greenland Sea, the Norwegian Sea and the Barents Sea as a confirmation of Luxemburg's insistence on capital's persistent need for an outside, a non-capitalist space to exploit (Bryan and Milne 2023). Whether the Internet is run privately or by the state makes no difference. If we think of the earlier optimism of the Internet as a digital commons with the promise of free-flowing communication, entertainment, and education we can see today how that enthusiasm and participation has served as a new site of extraction for various corporations.

This is not to say that such endeavours should be abandoned, but a broader political program is necessary otherwise such infrastructural expansion will continue the expansion of capitalist accumulation, whether ISPs are in private or state hands will not necessarily change that. In Luxemburg's works, we do not see a Luddism in the pejorative use of the word as a blanket rejection of technologies. Instead, we should understand her as, like Marx, seeing that "the struggles against machines were the struggles against the society that utilized them" (Mueller 2021, 24) and embracing "a more liberatory politics of work and technology" (29).

Luxemburg reminds us that so long as capitalism is intact you cannot take the progressive technologies available and make them serve the purpose of human emancipation.

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On a Potential Paradox of a Public Service Internet

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Abstract: Digital capitalism undermines deliberative democracy. This is the diagnosis arrived at by *The Public Service Media and Public Service Internet Manifesto* (2021), edited by Christian Fuchs and Klaus Unterberger, and Jürgen Habermas' *A New Structural Transformation of the Public Sphere and Deliberative Politics* (2023). They condemn the commercial Internet as a deformation of the public sphere and conclude that it needs to be fundamentally restructured. Interestingly, both texts propose to restructure it after the template of broadcasting media. We seek to challenge this approach from a media-political perspective, arguing that it revives an elapsed version of democracy by rekindling the mass media paradigm to which it was bound. Both texts are implicitly based on the assumption that a technology that emerged in capitalism can be used for different, even contradictory, purposes. But what if the media structure of digital communication, irrespective of who owns or controls it, denies its democratic instrumentalisation?

Keywords: digital capitalism, late capitalism, deliberative democracy, mass media, alternative Internet, Public Service Internet, technology, Habermas

1. Introduction

This paper examines the complex nexus of democracy and media technologies in the age of digital capitalism. For this purpose, two recent publications will be juxtaposed: *The Public Service Media and Public Service Internet* (2021, hereafter: *PSMIM*), edited by Christian Fuchs and Klaus Unterberger, and Jürgen Habermas' *A New Structural Transformation of the Public Sphere and Deliberative Politics* (2023)[1]. Both texts condemn the current commercial organisation of the Internet[2] for its deformation of deliberative democracy. Both argue that the Internet needs to be restructured after the template of traditional broadcasting media, more specifically Public Service Media, to safeguard democracy. From this juxtaposition derives a set of interlinked aims. First, we seek to demonstrate the key parallels between these two criticisms, the debatable understanding of technology within capitalism that informs them, and their shared roots within Habermas' earlier theory of the public sphere. Second, in going back to this earlier theory, we want to highlight a central paradox that emerges concerning Public Service Media and their history, whereby their mission to democratise can itself be deemed undemocratic because of its centralised administration of the *per definitionem*

[1] First published as "Überlegungen und Hypothesen zu einem erneuten Strukturwandel der politischen Öffentlichkeit" in a special issue of *Leviathan* 49 (2021): 470-500.

[2] We define the Internet as an assemblage of four layers: first, the global system of connected networks using the TCP/IP protocol; second, the interlinked web of websites based on that network; third, the different local computing machines (personal computers, smartphones etc.) on which browsers are installed to access the websites, and fourth, the organisations and institutions (like ICANN etc.) that regulate the Internet.

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unadministered public sphere. Third, this paradox will be examined as a microcosm of the precarious approximation of democracy and capitalism in the Fordist age – an approximation predicated on the mass media paradigm, whose dissolution in the post-Fordist age reveals digital media as an ideal expression of the neoliberal erosion of mass democracy. In a final step, we argue that an emancipatory politics under digital capitalism cannot rely on remedies that revive an elapsed version of democracy by rekindling the mass media paradigm to which it was bound. Rather – and we can only point to this outlook without engaging with it here – it is the idea(l) of democracy itself that must be rethought, not against but alongside the Internet's current structure.

2. The Internet's Destruction of Deliberation

Democracy plays a key role in the *PSMIM*. Its first principle states: "Democracy and digital democracy require Public Service Media" (Fuchs and Unterberger 2021, 8). Its second principle clarifies: "A democracy-enhancing Internet requires Public Service Media becoming Public Service Internet platforms that help to advance opportunities and equality in the society" (8). The inception of a new media-technological infrastructure like the Public Service Internet not only entails but actively strives for the transformation of political consciousness within the novel communicative situation it engenders. The *Manifesto*'s third principle consequently proclaims that "Public Service Media content is distinctive from commercial media and data companies. It addresses citizens, not consumers," (8) while the seven remaining principles add to this telling enumeration the importance of a funding structure independent of the state and private corporations, which ensures the creation of formats and contents that "realise fairness, democracy, participation, civic dialogue and engagement on the Internet" (8).

For the *PSMIM*, to restructure the dominant media landscape and, therein, the Internet means to restore the possibility of truly democratic communication. This commendable plea raises a question: What joint vision of democracy and digital media is represented here? We suspect that an answer to this question may disclose some of the assumptions that permeate the discourse surrounding digital capitalism concerning (i) the relationship between digital capitalism and democracy in the Global North, and (ii) the relationship between capitalism and technology more generally.

The need for a Public Service Internet arises from the "threat to democracy" (21) posed by the prevailing commercial order of the Internet and its oligopolistic platforms. Put succinctly in a later chapter of the *Manifesto*:

> "The Internet and the media are today dominated by commerce, digital surveillance, targeted and personalised advertisements, fragmented online publics, filter bubbles; the lack of human listening, engagement and meaningful debate; a highly individualistic attention economy where a few influencers dominate visibility and voice, false news, post-factual politics, authoritarianism; online hatred in the form of digital fascism, right-wing extremism, racism and conspiracy theories that spread on the Internet and social media; algorithmic politics where bots try to control political communication and so on" (114).

The primary diagnosis of this assertion is one of *encumbered communication*. It retraces a well-known image of a cacophony of voices (Pajnik and Downing 2008; Carr 2010), uninterested in compromise or constructive discussion, pushed towards individualism by algorithms that reward sectarianism over unanimity to monetise attention (Pariser 2011), all within echo chambers whose confusion of fact and fiction conjures distrust in political institutions (Harsin 2015). For the *PSMIM*, this undermining of

rational debate spells the "*destruction of deliberation, the public sphere and democracy*" (Fuchs and Unterberger 2021, 116) – a threat that can only be counteracted through the creation of a public service infrastructure of free, yet mediated discussion.

The wording of this tricolon – deliberation, public sphere, and democracy – divulges an unmistakable Habermasian rhetoric traceable throughout the *PSMIM*. It comes to the fore most explicitly in Graham Murdock's (2021) contribution to the Manifesto-book, in which he references *The Structural Transformation of the Public Sphere* (Habermas 1962) when ascribing to his vision of the digital commons "the potential to create contemporary coffeehouses without walls and social exclusions, combining access to the full range of imaginative and information resources that support effective participation with new spaces of encounter and deliberation" (Murdock 2021, 86). This revival of a liberal vision of democracy – based on the power of deliberation as the consensus-driven rule of the majority – is itself reminiscent of the "explosion of initiatives in the second half of the 1990s making reference to 'virtual' democracy" (Jankowski and van Selm 2000, 149) that celebrated concepts like the "digital agora" for its ability to mend the fragmented public sphere (Rheingold 1995; Tsagarousianou, Tambini, and Bryan 1998). Within these initiatives, Habermas' notion of the public sphere is portrayed as having been saved from its protracted decline, or even truly realised for the first time.

Naturally, the *PSMIM* offers a decidedly more critical approach. It maintains that if the Internet does not yet fulfil this messianic quality, it at least harbours its potential once restructured into a Public Service Internet that restores the supremacy of communicative over instrumental reason. It should not come as a surprise, then, that Habermas himself signed the *Manifesto*, shortly before publishing his own revaluation of his 1962 ideas in his book *A New Structural Transformation of the Public Sphere and Deliberative Politics* (2023) to which we will now turn.

Habermas' diagnosis of the digital downfall of deliberative democracy evinces many similarities to that of the *PSMIM*. He criticises the communicative situation of social media, which endorses "a further advance in the commodification of lifeworld contexts" by adhering to "the imperatives of capital valorization" (Habermas 2023, 46-47). The danger of this subversion of communicative reason – which in the 1980s Habermas had elaborated as the "colonization of the lifeworld" (Habermas 1987/1981, 333) – lies in the creation of what, in the German original, he calls *Halböffentlichkeiten*, i.e., semi- or pseudo-public spheres created by intrusions of private matters into the public sphere. Under digital capitalism, these intrusions form more than mere temporary amalgamations; they gradually impair "*the perception* of this boundary between the private and public spheres of life" (Habermas 2023, 21). Habermas attributes to the private sphere all non-political areas of social life, e.g., family and leisure time but also the larger market economy as well as relations of production and class. The public sphere, by contrast, is constituted by the convocation of private individuals for the processes of rational-critical debate and will formation, which, in turn, legitimate and scrutinise the legislative authority of governmental institutions (Habermas 1996/1992, 442). Tensions between the private and public spheres are neither new nor bound to a specific medium. They are constitutive of representative democracies as such and point to the inherent struggle between capitalism and democracy. However, these tensions are exacerbated by digital media. They erode the phenomenological line between public and private and instrumentalise this erosion as a lucrative catalyst of user engagement. The fragmentation of the public sphere becomes its own mode of accumulation, reinforced within *filter bubbles* that make deliberation increasingly impossible:

> "From a point of view fortified by the mutual confirmation of users' judgements, claims to universality extending beyond their own horizons become suspect in principle of hypocrisy. From the limited perspective of such a *semi-public sphere*, the political public sphere of constitutional democracies loses the appearance of an inclusive space for a possible discursive clarification of competing claims to truth and a general equal consideration of interests". (Habermas 2023, 55)

Again, we encounter a diagnosis of *encumbered communication*. For Habermas, the communicative situation of digital platforms must be understood not only regarding the political discourse it enables or inhibits but also concerning the experiential parameters it imposes on will formation and participation. What is key, in this context, is Habermas' specific understanding of "deliberative democracy", which is as much a media-theoretical concept as it is a political one (Dahlgren 2005, 156). It is this duality that informs his argumentative structure. Habermas begins by emphasising the existential necessity of deliberation within the heterogeneous society of the twenty-first century. It is more than an ideal by which a given socio-political order is to be measured, because "[t]he more heterogeneous a society's conditions of life, cultural forms of life and individual lifestyles are, the more the lack of an a fortiori *existing* background consensus must be counterbalanced by the commonality of public opinion and will *formation*" (Habermas 2023, 10). Within a plurality of worldviews, deliberation acts as a *filter* that "takes into account the expectation that solutions to problems should be cognitively correct and viable" and that "*grounds* the *assumption* that the results are rationally acceptable" (13). Only then can consensus be "institutionalized in a way that incorporates communicative reason" (Deitelhoff 2018, 529). This process of filtration lays claim to two forms of representation:

(i) The inclusion of the electorate "in the representative bodies of parliamentary lawmaking" (Habermas 2023, 14); (ii) the representation of a "more or less *informed pluralism of opinion* filtered by the media system" that enables citizens "to form his or her *own* opinion and to make *an election decision* that is *rationally motivated* from his or her point of view" (15).

Together, political *and* media representation counteract the "cacophony of conflicting opinions unleashed in the public sphere" (17). It is exactly this system of filtration that is corrupted by the commercial Internet, where – as we have seen in the *PSMIM* – the cacophony of voices is turned into a mode of accumulation. This leads both texts to the same conclusion: To afford true democratic deliberation, principles of filtration must be imposed upon the Internet; it must be remodelled after the template of broadcasting media.

3. Two Media Paradigms

The top-down or "gatekeeper" structure of broadcasting media – by which Habermas mostly means radio and television – creates a public space "in which the communicative din can condense into relevant and effective public opinions" (Habermas 2023, 31). Naturally, this does not mean that mass media are somehow immune to the private appropriation or circumnavigation of their filtering system on the levels of either production or consumption. Nevertheless, these cases form exceptions rather than the rule within its media paradigm. The same cannot be said for the Internet. "What *is* different", notes Cass R. Sunstein, "is a dramatic increase in individual control over content and a corresponding decrease in the power of general interest intermediaries, including newspapers, magazines, and broadcasters" (Sunstein 2009, 95). "One effect

is the self-empowerment of media users," writes Habermas, "the other is the price the latter pay for being released from the editorial tutelage of the old media" (Habermas 2023, 38). He concludes:

> "It is harmful for a democratic system as a whole when the infrastructure of the public sphere is no longer able to direct the citizens' attention to the relevant issues that need to be decided or to ensure the formation of competing public opinions – and that means, *qualitatively filtered* opinions" (Habermas 2023, 57)

It is interesting how a certain "qualitative" kind of filtration is deemed necessary, while certain other forms of filtration, i.e., filter bubbles, are seen as problematic. Habermas sees the "fundamental flaw" in the fact that "platforms, unlike traditional media, do not want to accept liability for the dissemination of truth-sensitive, and hence deception-prone, communicative contents" (58). Against the white noise that threatens the public sphere, qualitative filtering must be reestablished within a media structure "that enables the inclusiveness of the public sphere and the deliberative character of public opinion and will formation" (59). This is Habermas' version of an alternative Internet. He weighs the bottom-up filter bubbles of digital platforms against the top-down qualitative filtering of classical mass media. An 'alternative Internet' is urged to behave like radio and television – one media paradigm is thus imposed onto another.

Although Habermas' theoretical reflections represent a different genre of text than the politically pointed *PSMIM* with its concrete demands, some decisive parallels can nevertheless be identified in their approaches to an alternative Internet. The point here is not to ascribe to them the same project simply because Habermas has signed the *Manifesto*, but to work out a set of shared presuppositions regarding the relationship between democracy and digital media. Like Habermas, the *Manifesto* criticises that "[d]igital technologies' dominant forms and uses are destroying traditional media structures" (Fuchs and Unterberger 2021, 114). Against this backdrop, "public broadcasting" (9, 11, 91) is from the very beginning the template which directs the transformation of the Internet. The idea is to de-privatise the Internet, to turn it into a publicly funded broadcasting infrastructure similar to the German first and second television programs or the BBC: "The original idea was simple and changed society: A public broadcasting service that is paid for out of public funds, independent of government, equally accessible to all, provides trusted information and analysis of issues that are of common concern" (9). In accordance with its genre of text, the *Manifesto* goes a decisive step further than Habermas' theoretical inferences. It envisions a complex amalgam of centralised mass media and decentralised digital media technologies. Thus, an alternative Internet not only builds on the structures of broadcasting media but enriches them: "Public Service Internet platforms build on the broadcast model and go beyond it by making full use of and transforming the creative potentials of digital technologies and user participation" (14). This is a crucial difference between the two texts at hand: A democratic Internet according to the *PSMIM* would offer a space of deliberation, where "rights to speak are matched by responsibilities to listen attentively, and in good faith, to rival claims" (85). Ideally, the Public Service Internet would combine the top-down filtration of mass media with the subjectivity of the *prosumer* fostered by new media.

In the impressive survey that forms the *Manifesto*'s basis, many voices formulate hopes in this vein: "In 2040, Public Service Media has transformed from one-to-many broadcasting institutions into a network infrastructure that is guided by principles of public network value" (17). Others include: "[I]n the best possible world, the internet is entirely demonetized, that is nobody even thinks of making money off it" (Fuchs 2021b,

31). Or: “There is no media industry, neither large conglomerates nor individual wannabe stars. Advertising and intellectual property are banned, or at least heavily taxed” (Fuchs 2021b, 31). These examples point to social contexts very different from ours: an obviously post-capitalist world that is at least partially demonetised with no advertising or intellectual property. But the *Manifesto* is not about post-capitalism. It is about the more modest transformation of the Internet, for which mass media form the basic template. Nonetheless, it remains unclear to what extent this vision is compatible with the actual media specificities of either broadcasting media or the Internet. How can a single medium possess the “productive role of journalistic mediation and programme designed performed by the old media” (Habermas 2023, 36), while simultaneously ensuring every single user’s “rights to speak” (Murdock 2021, 85)? Before turning to the deeper incongruities that this unanswered question opens up, we will turn to its implications concerning the relationship between technology and capitalism. To speak about a possible restructuring of the Internet at all, is to suggest that a media technology can be somehow ‘repurposed’ and distanced (if not separated) from its origins. While we are not arguing against this notion, we think it necessary to place it in a wider theoretical context that will allow us to grasp its implications concerning the democratic potential of digital media.

4. The Question of Technology and Capitalism

Habermas and the *PSMIM* hold that the technological infrastructure of societal communication is deformed and must be changed to restore the, somewhat idealised, status of democracy given with public broadcasting media. One can imagine that the question of technological transformation has even to be radicalised when envisioning the transition to a post-capitalist society (as can be seen from many of the answers to the survey in the *PSMIM*, 19-68). But a mere remodelling of the Internet after the template of broadcasting media, which were, despite not being owned solely privately, characteristic for capitalist democracies in the second half of the twentieth century, is presumably not enough for post-capitalism. But can an alternative politics be realised by using ‘differently’ a technology that emerged in capitalism? Indeed, this is a much-discussed question in critical theory that Habermas himself discussed in his 1968 essay “Technology and Science as ‘Ideology’”. Here, he distances himself from Herbert Marcuse, who argues that in a post-capitalist society, “science would arrive at essentially different concepts of nature and establish essentially different facts” (Marcuse 2007/1964, 170). From this, Marcuse concludes that a different technology must be conceived:

> “To the degree to which the goal of pacification determines the Logos of technics, it alters the relation between technology and its primary object, Nature. Pacification presupposes mastery of Nature, which is and remains the object opposed to the developing subject. But there are two kinds of mastery: a repressive and a liberating one” (Marcuse 2007/1964, 240).

Habermas argues against this, claiming that technology is an anthropological feature of the “human species *as a whole*, and not one that could be historically surpassed” (1970/1968, 87). Andrew Feenberg (1996) discusses the relation between Habermas’ and Marcuse’s approaches, underlining especially the notion of “design”. He argues against Habermas that technological rationality is not neutral but also against Marcuse that a change of technology does not presuppose a quasi-Heideggerian shift in being – but that a different design in accordance with an appropriate politics might bring

decisive improvement. Habermas observes: “In many passages of *One-Dimensional Man*, revolutionizing technological rationality means only a transformation of the institutional framework which would leave untouched the forces of production as such” (1970/1968, 88). There is e.g., one passage by Marcuse which reads: “Technics, as a universe of instrumentalities, may increase the weakness as well as the power of man” (2007/1964, 240). Marcuse gives an example surprisingly close to the case we discuss here:

> “One may still insist that the machinery of the technological universe is ‘as such’ indifferent towards political ends – it can revolutionize or retard a society. *An electronic computer can serve equally a capitalist or socialist administration* […]. This *neutrality* is contested in Marx’s controversial statement that the ‘hand-mill gives you society with the feudal lord; the steam-mill society with the industrial capitalist.’ And this statement is further modified in Marxian theory itself: the social mode of production, not technics is the basic historical factor. However, when technics becomes the universal form of material production, it circumscribes an entire culture; it projects a historical totality – a ‘world’ (Marcuse 2007/1964, 157-158; our emphasis; Marcuse quotes Marx 1936/1847, 92[3]).

It is interestingly the “electronic computer” which is used to discuss the notoriously difficult problem of the neutrality of technology. This problem is discussed in many different fields of critical theory (starting perhaps with Marx), and this is hardly surprising, given the central role of technology in capitalist modernity. That we speak today of “digital capitalism” is another example of that: “Technology is not neutral. We’re inside of what we make, and it’s inside of us” (Haraway, quoted in Kunzru 1997). We want to underline four central elements of this problem:

1. *Potentiality and concrete uses*: The neutrality of technology means that technology can be used in (politically) different ways – a simple example: A knife can be used to cut vegetables, but it can also be used to kill. Its potential to cut does not dictate *what* will be cut, but without a knife, *cutting* as such is impossible (or at least more difficult). This, of course, changes things. A “world” – as Marcuse puts it – with cutting is different from one without. This potentiality is political in the sense that it introduces possibilities and barriers that did not exist before. The Internet is a complex technology that has never been wholly public or wholly private, wholly commercial or wholly non-commercial, and that allows many different ‘good’ or ‘bad’ uses. It has yet to be shown what its potentialities are for democratic politics. The alternatives envisioned by the *PSMIM* and Habermas point in this direction, yet the Internet’s actual historical development, which has made their interventions necessary in the first place, points in another.

2. *Graduality of (Non-)Neutrality*: There might be technologies that are more or less neutral than others. There might be racist and sexist biases in digital systems, either consciously inscribed or, more likely, because given datasets are formed by a racist history (Noble 2018). While it seems plausible that complex software and its big data sets can be biased, in the case of a much simpler technology like a hammer this is not so easy to see: Can a hammer be racially biased? As Langdon Winner (1980) writes in his much-debated paper:

> “First are instances in which the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in a particular

[3] On the different concepts of the machine in Marx see McKenzie (1984).

> community. […] Second are cases of what can be called inherently political technologies, man-made systems that appear to require, or to be strongly compatible with, particular kinds of political relationships" (Winner 1980, 123).

For the first case, Winner gives the example of New York bridges whose low height excludes buses and therefore the poorer – and black – part of the population. For the second case, he uses the example of nuclear energy – a technology that requires partially authoritarian structures simply to safeguard the reactors. The first case could have *different* political implications and is thus 'more neutral.' The second case enforces a certain political structure and is therefore 'less neutral.' Viewed within this framework, the Internet is not a technology that enforces a certain politics, but since it is a complex assemblage of different hardware (who is connected, with what speed?) and software (how are the interfaces designed?) it is surely less neutral. It is inscribed with a certain politics.[4] This politics cannot be separated from the media technology that embodies and concretises it. It is this separation, however, that Habermas and the *PSMIM* ostensibly deem not only possible but necessary when calling for the imposition of one media paradigm upon another.

3. *Historicity and Specificity*: For the discussion at hand, this is the most important aspect. Already in Marx, we can find the idea that technology has political implications: "It would be possible to write a whole history of the inventions made since 1830 for the sole purpose of providing capital with weapons against working-class revolt" (1976/1867, 562). Suppose this would be true for the Internet too – and given its current use as a technology of worker and consumer surveillance this does not seem too farfetched –, the question stands: Could it then be used differently? Marx's formulation is ambiguous: Does it say that (i.) a technology developed in capitalism is 'inherently capitalist,' or does it (ii.) mean that it is neutral and is only used for class war? Habermas and the *PSMIM* ostensibly side with the second option. But (iii.) are these even different options? Perhaps in going back to the question of the graduality of neutrality: (ad i) 'Inherently capitalist' would mean that a technology can only be used for capitalist purposes, while (ad ii) there are technologies that *can* be used otherwise.

In some newer approaches, the view that technology is indeed neutral and can be used for better or worse, which dominated (post-)Marxist theoretical tradition, is decidedly doubted. Giest (2016), for example, insists on a rereading of Marx's notion of real subsumption, which describes how technologies are not only used but formed by capital. Kurz (2004, 112-121) adds from the perspective of revolutionary politics how the 'artefacts from history' should be filtered for use in a post-capitalist society. He uses the notion of "Formvergiftung" ("poisoned form," 117, 118, 119) to demonstrate how things developed in capitalism are contaminated by its principles.[5]

From this perspective, it becomes clear that Habermas' and the *PSMIM*'s notion of an alternative Internet is based on the anything-but-settled assumption that the Internet is a neutral technology that can be used for different, even contradictory, purposes. While the *Manifesto* – in its more inclusive vision of an amalgam of mass and digital media infrastructures – makes an argument for neutrality on the grounds that the

[4] Regarding the wide field of alternative networks, especially for minorities and in the Global South see e.g., Goggin and McLelland (2017), Bory (2020), Acey et al. (2021).

[5] For other discussions of these problems in different forms of (post-)Marxist Theory see Panzieri 1972 and Castoriadis 1984, 221-248; on technology in Castoriadis see also Ernst/Schröter 2022; see also the overview Feenberg 2010, 67-82. For theoretical positions in non-Marxist fields, especially in "Science and Technology Studies" (= STS), see e. g. Latour 1991. Feenberg (1996, 46, 54) relates Habermas, Marcuse to STS.

Internet's (currently anti-democratic) politics may potentially be 'balanced out' through an expansion and enhancement of its technology with other centralised mechanisms, Habermas writes on the genealogy of the Internet:

> "The globally expanded zone of free flows of communication originally made possible by the invention of the technical structure of the 'net' presented itself as the mirror image of an ideal market. This market did not first have to be deregulated. In the meantime, however, this suggestive image is being disrupted by the algorithmic control of communication flows that is feeding the concentration of market power of the largest internet corporations" (Habermas 2023, 58)[6].

The emergence of net oligopolies is, of course, not a distortion of the deregulated flow of communication but its logical consequence. In that sense, the Internet was – since its opening for commerce in 1992 (Ceruzzi 2008, 29-30) – a capitalist technology. But even then, the fact that it was not always open for commerce points to the possibility of another Internet, as does the case of Chinese regulation which shows that 'designs' (in Feenberg's sense) are possible that have been thought impossible in the utopian days of the Internet.[7]

4. *Unintended effects*: In *Capital*, *Vol. 3* Marx writes: "The development of the productive forces of social labour is capital's historic mission and justification. For that very reason, it unwittingly creates the material conditions for a higher form of production" (Marx 1981/1894, 368). In the German original "unwittingly" is "unbewußt." This means that technologies that are made to have capitalist effects could also exhibit unexpected – unconscious – side effects. Although productive forces are made to expand the capitalist mode of production, they may also lead to its destruction (concerning the Internet see on this point Schröter 2012). Any technology – even a "poisoned" one – can exhibit effects *neither intended by design nor by use*. Since "the" Internet is a complex assemblage of different hardware, software, practices, politics etc. it possesses an instability and malleability, as Feenberg (2012) underlines. Its commercialisation after 1992 had unintended side effects – e.g., the disruption of copyright, which is fought with the law. The idea that the availability of information would lead to mass enlightenment led to the white noise of way too much information. A vision of cyberdemocracy turned into its opposite. Because of such unintended effects, it might be generally impossible to construct an Internet with stabilised political benefits. This possibility should not be understood as a defeatist cop-out or a call for a *laissez-faire* approach to an Internet that could sooner or later "turn democratic" on its own. Instead, it opens up the possibility that the *same* structures of the Internet that have overwhelmed and destabilised the principles of representative and deliberative democracy may yet afford new forms of post-democratic (Dean, Anderson, and Lovink 2006) politics that draw not from ideals of representation and filtration but connectivity and flux. This should accompany any notion of a restructuring of the Internet for the purpose of democratisation – especially when it involves the imposition of an older media paradigm whose own graduality of neutrality is left surprisingly unaccounted for.

5. Democracy and Mass Media

Habermas and the *PSMIM* view the Internet as a sufficiently neutral technology, not inherently poisoned by the capitalist circumstances of its conception – a technology

[6] On the discourse of the Internet as the perfect market, see Schröter 2004, 123-132.
[7] On Internet utopias see Schröter 2004, 20-148 and Flichy 2007.

whose democratic potential can be restored through the imposition of a mass media paradigm. To contextualise this view, it is high time to take a closer look at the role mass media previously played in the book that explicitly underlies the *PSMIM*'s idea(l) of deliberative democracy, and from which Habermas derives the title of his work: *The Structural Transformation of the Public Sphere* (1962).

For anyone familiar with his *Habilitationsschrift*, Habermas' recent lament over the public's release from the "editorial tutelage of the old media" (Habermas 2023, 38) likely comes as a surprise. Was it not these same media that he had previously condemned as gravediggers of democracy:

> "Under the pressure of the 'Don't talk back!' the conduct of the public assumes a different form. In comparison with printed communications the programs sent by the new media curtail the reactions of their recipients in a peculiar way. They draw the eyes and ears of the public under their spell but at the same time, by taking away its distance, place it under "tutelage," which is to say they deprive it of the opportunity to say something and to disagree" (Habermas 1991/1962, 170-171).

The top-down structure of mass media – rehabilitated sixty years later as a template of qualitative filtering – is thereby charged with the manipulation of its audience. Mass media's specific constellation of reception based on spatial and temporal synchronicity weakens deliberation by imposing its own experiential parameters onto the process of will formation and participation. Its technology is not neutral but charged, from the very beginning, with manipulative power.

We have encountered this argument before in Habermas' criticism of digital pseudo-public spheres, which is thus not as specific to the Internet as it may have first appeared. In 1962, Habermas writes: "The deprivatized province of interiority was hollowed out by the mass media; a *pseudo-public sphere* of a no longer literary public was patched together to create a sort of superfamilial zone of familiarity" (Habermas 1991/1962, 162; our emphasis). This entails the influx of private opinions into the public sphere. Instead of *preventing* this influx – as is argued in 2023 – , the top-down structure of mass is actually said to *enforce* it: "Thus, discussion seems to be carefully cultivated and there seems to be no barrier to its proliferation. But surreptitiously it has changed in a specific way: it assumes the form of a consumer item" (164). Debate is turned into an item of consumption; audiences are addressed not as citizens but as consumers. The "web of public communication [is] unraveled into acts of individuated reception, however uniform in mode" (161), while public opinion has "decomposed into the informal opinions of private citizens" (247). Is this description not a structural precursor of the Internet's sectarianism – filter bubbles *avant la lettre*? While debate in a world of letters was unformalised, mass media debates are *filtered* and administered; "the rational debate of private people becomes one of the production numbers of the stars in radio and television, a salable package ready for the box office" (164). The principles of filtration that would later form the template of an alternative Internet are thereby criticised due to their restriction of self-directed deliberation.

In 1962, Habermas explicitly criticised mass media for their anti-democratic character. Crucially, the aspects he criticised are strikingly similar to those at the heart of his critique of digital capitalism – privatism, pseudo-public spheres, 'filter bubbles', and consumerism, all leading to a diagnosis of encumbered communication. Mass media are shown to be incommensurable with a democratic public as understood by C. W. Mills – to whom Habermas gives the last word – , where "(1) virtually as many people

express opinions as receive them. (2) Public communications are so organised that there is a chance immediately and effectively to answer back any opinion expressed in public" (Habermas 1991/1962, 249). Does this not sound like the rhetoric of the early Internet as a harbinger of democracy?[8] Why, then, impose on such a technology (if it is indeed neutral and re-usable) the same structure of mass media that Habermas had charged with the ruinous deformation of the public sphere sixty years prior? We argue that an answer to this question is found less in the *structures* of the media in question – after all, they share more than a few qualities concerning their relation to the public sphere – and more in their relationship to the development of capitalism during the twentieth century.

6. The Paradox of Public Service Media

Let us address a potential refutation of our portrayal of Habermas' critique of mass media: What if he is talking about privately owned media? After all, both he and the *PSMIM* call for the restructuring of the Internet not after the template of privately owned networks but after that of de-privatised Public Service Media. These are not arms of a state apparatus, but a mainstream alternative to commercial broadcasting whose goals of pluralism, regional representation, accessibility, and information transcend those of mere profit. Habermas can indeed be credited with an ambivalent view of mass media. Especially in his later work, he repeatedly advocates for the retention of Public Service Media and the strengthening of a "quality press" that takes responsibility for allowing citizens to engage in informed discourse. This differentiation would mean that the mass media paradigm possesses two versions, only one of which is deemed detrimental to deliberative democracy.

There are two counterarguments to this point, for which our reflections on technology form the basis. First, Habermas' argument is nonetheless media ontological. By focusing on the "Don't talk back" communicative situation, he criticises private as much as public service media – both are based on a top-down structure, although the goals to which this structure is put differ between the two. Second, Habermas himself relates his criticism of mass media to the early stages of Public Service Broadcasting. He notes that, compared to the "journalism of private men of letters" (Habermas 1991/1962, 188), mass media's technological reach, ideological influence, and economic concentration were quickly deemed too great to be left to private corporations:

> "Indeed, their capital requirements seemed so gigantic and their publicist power so threatening that in some countries the establishment of these media was from the start under government direction or under government control. Nothing characterized the development of the press and of the more recent media more conspicuously than these measures: they turned private institutions of a public composed of private people into public corporations (*öffentliche Anstalten*)" (Habermas 1991/1962, 187).

Early on, mass media's concentration of wealth and information in the hands of private oligopolies was counteracted through state intervention. With the notable exception of the United States, this intervention was undertaken particularly in France, Germany, and Great Britain, where "these new media were organized into public or semipublic corporations, because otherwise their publicist function could not have been

[8] Indeed, the Internet is often explicitly commended for its *overcoming* of mass media, see Pfister and Yang 2018, 252; Bedal 2004, 38; and Curran 2012, 3.

sufficiently protected from the encroachment of their capitalistic one" (Habermas 1991/1962, 188). It is here that we encounter the paradox of Public Service Media in relation to the public sphere. Setting aside for a moment Habermas' media-ontological critique, the increased reach of mass media meant an expansion of the public sphere. This expansion meant that more people could partake in democratic deliberation. However, the concentration that went along with this expansion necessitated state intervention to ensure its democratic use. For Habermas, this intervention stands in conflict with the public sphere, in which "institutions of the public engaged in rational-critical debate were protected from interference by public authority by virtue of their being in the hands of private people" (188). But it is this being in the hands of private people that made state intervention necessary in the first place. In other words, the more effective an institution becomes in terms of democratic publicity, the more susceptible it becomes to private interests. The state tries to mitigate this susceptibility by turning mass media into Public Service Media, but by intervening, it administers the *per definition un*administered public sphere. Paradoxically, the attempt to democratise is itself deemed undemocratic. Even the attempt to 'repurpose' or 'restructure' mass media, to use their technology against its poisonous tendency of concentration in the name of quality press, is inimical to will-formation and discussion. Does this not mean that the very *mission* of Public Service Media stands in conflict with the liberal public sphere and its notion of deliberative democracy?

The *PSMIM* is also not immune to this paradox. As laid out by its foundational principles, the Public Service Internet necessitates its independence from private corporations and the state. Fuchs argues in a different work that it was through the involvement of both that the digital public sphere has "been colonised and feudalised. We can then speak of an alienated digital sphere and alienated communication but not of a digital public sphere" (Fuchs 2021a, 13)[9]. Similar to Habermas' condemnation of net oligopolies as a distortion rather than the logical consequence of the deregulated flow of digital communication, Fuchs envisions the Internet as a neutral technology that was later territorialised against its will. Despite a difference of almost sixty years, the intermediary position between capital and the state thus occupied by an *un*colonised digital public sphere is strikingly similar to the one Habermas ascribes to the bourgeois public sphere in 1962 (Fuchs 2020, 217). We have already questioned the blind eye turned to historical media specificity contained in this correlation. But what is equally left open is the development of the relationship between democracy and capitalism that traverses the same period. Neither democracy nor the state (nor even capitalism) fulfil the same functions as they did in the liberal public sphere. How, then, can the digital public sphere be modelled after its bourgeois predecessor? It seems that the imposition of one paradigm onto another applies not only to the media side of deliberative democracy but also to its political one.

The paradox of Public Service Media adds another layer to the dubious use of deliberative democracy and mass media as ideals of an alternative Internet. Restructuring the commercial Internet after the template of mass media already becomes questionable when the same criticisms launched against the Internet – pseudo-public spheres, consumerism, privatism, and encumbered communication – are used against mass media. When further contextualised within the development of capitalism, however, these criticisms become visible as belonging to a much larger transformation in the relationship between state democracy and capital. Just as there is, on the level of

[9] This rhetoric of colonisation – itself derived from Habermas' "colonization of the lifeworld" – appears repeatedly in the discourse of digital capitalism, see e.g., McChesney 2013, xii, 97.

media theory, no going back to a public sphere before the Internet, there is, on the level of political economy, no going back to a public sphere before private and political colonisation.

7. Capitalism and Mass Democracy

The paradox of Public Service Media points beyond itself to the broader relationship between democracy and capitalism. To map out this relationship as it pertains to digital capitalism, we will now analyse the socio-political developments effaced by the trans-historical idealisation of a 'stable' public sphere implied by Habermas and the *PSMIM*. We will use Habermas' own works (1962, 1973, 1981) as guiding points.

In *The Structural Transformation of the Public Sphere*, the state intervention that paved the way for Public Service Media forms part of a "dialectic of a progressive 'societalization' of the state [which] simultaneously with an increasing 'stateification' of society gradually destroyed the basis of the bourgeois public sphere – the separation of state and society" (Habermas 1991/1962, 142). From this dialectic emerges a "re-politicized social sphere in which state and societal institutions fused into a single functional complex that could no longer be differentiated according to criteria of public and private" (148). Habermas' criticism of pseudo-public spheres is not limited to media; it is tied to a historical politicisation of capitalism that Friedrich Pollock (1941) analysed as *state capitalism* and that Habermas (1973) would later call *late capitalism*. Mass media's concentration of power becomes visible, therefore, as a microcosm of a much larger discordance:

> "Under conditions of free competition and independent prices, then, no one was expected to be able to gain so much power as to attain a position that gave him complete control over someone else. Contrary to these expectations, however, […] social power became concentrated in private hands. […] The more society became transparent as a mere nexus of coercive constraints, the more urgent became the need for a strong state" (Habermas 1991/1962, 144).

Faced with the atrophy of monopoly capitalism, the state is forced to expand its prior role as a *Nachtwächter*, attributed to it by its liberal interpretation. It takes over hitherto privately organised services – mass media are one such 'service,' dwarfed for example by the organisation of production, commodity exchange, or social labour. Without changing the capitalist nature of (re)production, the state takes on the role of the *ideal collective capitalist*. It seeks to improve the use and movement of accumulated capital while enforcing the laws of private ownership over the means of production. With this, politics and private economics forfeit their mutual independence – the deformation of the public sphere is thus the necessary consequence of the state's forcible bid to *maintain* capitalism against its auto-cannibalistic tendencies.

The title of Habermas' 1973 book *Legitimation Crisis* points to the new form of state crisis that emerges from this repoliticisation of the social sphere: "Genuine participation of citizens in the process of political will-formation […], that is, substantive democracy, would bring to consciousness the contradiction between administratively socialized production and the continued private appropriation and use of surplus value" (Habermas 1992/1973, 36). The solution lies in the formalisation of democracy itself: "In order to keep this contradiction from being thematized, […] the administrative system must be sufficiently independent of legitimating will-formation" (36). The locus of will-formation – the public sphere – must be severed from actual fiscal policy. Ironically, the public sphere's liberal claim to independence is thereby used against it – not, however,

by denying this claim but by maintaining its empty shell at a time when this independence has long been made structurally impossible. To nonetheless cling to the independence of the public sphere – as do Habermas and the *PSMIM* – means either to ignore this historical development or, at worst, to reproduce the ideology of late capitalism that maintains this independence to gloss over its own contradictions.

To untie its legitimising from its administrative system, late capitalism de-politicises the public sphere. As active participation cannot be disallowed without risking a crisis of legitimation, it must be reduced to a minimum: "The state must preserve for itself a residue of unconsciousness in order that there accrue to it from its planning functions no responsibilities that it cannot honor without overdrawing its accounts" (68). The citizen must be turned into a consumer of products only capital and state welfare can provide. What is needed is a mechanism of *filtration*. This leads us back to mass media:

> "The political system produces mass loyalty in both a positive and a selective manner: positively through the prospect of making good on social-welfare programs, selectively through excluding themes and contributions from public discussion. This can be accomplished through a sociostructural filtering of access to the political public sphere, through a bureaucratic deformation of the structures of public communication, or through manipulative control of the flow of communication" (Habermas 1987/1981, 346).

In the second volume of *The Theory of Communicative Action* (Habermas 1987/1981), from which this passage is taken, Habermas relates late capitalism's apparatus of legitimation to his previous ontology of mass media as a poisoned form. The contradiction of mass democracy, i.e., the guarantee of universal suffrage faced with the *impossibility* of equal participation, is evacuated to the top-down structure of mass media, where "[p]ublicity in the sense of critical scrutiny of the state gave way to public relations, mass-mediated staged displays, and the manufacture and manipulation of public opinion" (Fraser 2018, 246). In a system in which everybody has gained the right to speak, a method needs to be contrived to deflect the majority of voices. Mass media offer a technological infrastructure for this "cleansing of political participation from any participatory content" (Habermas 1987/1981, 350), staging the citizen not as a deliberator but as a spectator.

8. From Late Capitalism to Digital Capitalism

The mass media paradigm is not *extrinsically* forced upon democratic deliberation. Rather, it is *intrinsically* adopted by it at a certain stage of capitalist development. Mass media did not *cause* the destruction of the public sphere as much as they lent a body to its destruction. This leads us to the final part of our analysis: What happens after the crisis of late capitalism? What happens when the forced marriage of democracy and capitalism approaches its neoliberal divorce, when the intertwinement of mass media and mass democracy is confronted by the Internet's logic of communication and accumulation?

As pointed out by Wolfgang Streeck (2011, 2012, 2017), the borrowed time that had buttressed the balance struck between Fordist capitalism and democratic welfare finally ran out in the 1970s. With the saturation of consumer markets, capitalist firms and democratic governments alike embarked "on a desperate search for a new formula to overcome what threatened to be a fundamental crisis of capitalist political economy" (Streeck 2012, 30). Since late capitalism's interdependence of capital and state, any economic crisis entails a political one – the crisis of Fordism thus possesses two sides:

the neoliberal reorganisation of state power and the restructuring of the dominant mode of production. We will now put these correlated developments into perspective to see what vision of democracy and media they give rise to. This will help us solidify the incongruities we have ascertained within the *PSMIM*'s and Habermas' approaches to digital capitalism.

Neoliberalism's universalisation of market rationality, privatisation of public services, and offshoring of labour to the Global South (Brown 2005, 42) mean the subversion of the welfare state. This gives rise to what Colin Crouch terms *post-democracy*: "Post-industrial capitalism has therefore started to try to undo the deals made by its industrial predecessor and tear down the barriers to commercialization and commodification imposed by mid-twentieth century concepts of citizenship" (Crouch 2004, 83). When public and private becomes one, the citizen-as-consumer is reproduced at a higher level. Streeck characterises the new mode of accumulation that accompanies this development as one of *individualisation* (Streeck 2012, 31). The mass production of Fordism is superseded by the flexible specialisation of post-Fordism, made possible primarily by the electronic computer (Fuchs 2012, 431; Schiller 2014, 23; Staab 2019, 58; Stewart and Hartman 2020, 174). To push consumption beyond saturation, the individualisation of production is paralleled by the individualisation of needs. A new politics of consumption arises that intensifies late capitalism's nascent capitalisation of the socio-cultural sphere through the systematic commodification of personal identity.

Streeck relates this post-Fordist logic of accumulation to a weakening of social relations. Tellingly, he uses the Internet as an illustration: "Sociation by social media – Twitter, Facebook and the like – represents an extension of this trend, not least in that it offers these companies a further set of tools for highly individualized marketing" (2012, 36). The communicative situation of social media – the elevation from spectator to *prosumer*, the personalisation of user profiles via the quantification of behaviour – makes the commercial Internet an ideal infrastructure for the post-Fordist market logic (Staab and Thiel 2021, 290-292). If mass media lent a body to the late capitalist mode of Fordist mass production and consumption, then the Internet lends a body to the neoliberal mode of post-Fordist individualisation. Its technology is not neutral. But if mass democracy depended on mass media's paradigm of spectatorship to sustain its legitimating function under late capitalism, then what happens to mass democracy in digital capitalism, whose media paradigm is based on individualisation? Does this logic not inevitably clash with mass democracy's enforced spectatorial passivity?

Looking at Streeck, the short answer is yes. After all, his argument is also a media-political one. The standardisation of mass media cannot live up to the singularisation of digital technologies. Streeck relates the resulting waning interest in standardised Public Service Media in favour of individualised streaming options to the parallel erosion of mass democracy tied to the mass media paradigm. The neoliberal commercialisation of the lifeworld pushes onto citizens and states the idea that "only private firms would be able to satisfy the rising expectations of more exacting consumers for increased attention to their emerging wants, in particular for more customized products" (Streeck 2012, 37). Governments are encouraged to seek legitimation in the reproduction of individualisation. The state submits to its new role as just another service provider; it tries to meet expectations of a universalised market logic that are incommensurable with the structure of a democracy that has – over the past century – already castrated itself to postpone the cannibalistic nature of capitalism. With this doomed emulation, the state finally loses even the pretension of democratic legitimation. We side with Streeck when he concludes:

> "Politics, therefore, cannot undergo the same re-engineering that capitalist firms and product ranges underwent after the Fordist era. […] *There is a strong sense in which politics will always at its core remain structurally akin to mass production, and as a consequence compare unfavourably to the ease and freedom of choice in modern consumer markets"* (Streeck 2012, 42, our emphasis)

There is indeed a strong sense that the heyday of mass democracy not only coincided with the dominant mass media paradigm of that time but was structurally bound to it. For a formalised democratic system to work within advanced capitalism, citizens *must be* spectators. The public sphere's independence must be maintained just enough to act as a legitimating base simultaneously undermined via an exclusionary system of top-down *filtration*. In our initial analysis of the *PSMIM* and Habermas, we ascertained that it is exactly this system of filtration that is corrupted by the commercial Internet. Now, however, we can see that the conclusion that both texts draw from this – the necessity for the Internet's restructuring in the image of mass media – can be read as an atavistic attempt to reanimate an elapsed version of democracy by rekindling the mass media paradigm to which it was bound. It ignores that the post-Fordist mode of accumulation, to which the commercial Internet lends an infrastructure, results from the *crisis* of late capitalism's mass media paradigm. To anachronistically reanimate this paradigm would not, therefore, evade but *reproduce* the parameters of the politico-economic crisis that has led us to the digital downfall of deliberative democracy. Moreover, to impose this paradigm onto the current Internet means to disregard that even if the Internet is not a technology that can be said to *enforce* a certain politics, it is nonetheless *inscribed* with one. Even if it did not trigger the crisis of Fordism, its communicative networks still 'fit' into the program of the post-Fordist flexibilisation of production (Schröter 2004, 286). Ultimately, the Internet lends a body to the neoliberal market logic that makes visible the structural impossibility of deliberative democracy in the Global North of the twenty-first century. Combined, these conclusions urge us to look for different strategies for counteracting the Internet's anti-democratic tendencies, especially when taking into consideration the unexpected – unconscious – side effects that its technology may still harbour for the organisation of democratic politics as such.

9. Conclusion

Digital capitalism spells the downfall of deliberative democracy. *The Public Service Media and Public Service Internet Manifesto* and *A New Structural Transformation of the Public Sphere and Deliberative Politics* make convincing cases for the need to restructure the commercial Internet to create and safeguard communicative situations necessary for deliberation and participation. Their shared objective to model an alternative Internet after the template of broadcasting media is, however, fraught with several incongruities, which this paper hopes to have demonstrated. The key point that has led us to question their nevertheless commendable approaches can be formulated as follows: Instead of viewing the commercial Internet as a cause of the decline of democracy, it should be comprehended as *born from the same logic of accumulation* that has brought to the fore the inherent contradiction between democracy and capital. In transforming the experiential parameters of democracy, digital capitalism has made painfully visible the *spectatorial role* forced upon citizens a long time ago. When this role – tied as it was to mass media – was then superseded by new media's *prosumer*, the depoliticisation of the public sphere bestowed by late capitalism upon its neoliberal heir is transformed into a reflexive mode of accumulation. The hollow shell of audience democracy begets a new politics of consumption that finds its catalyst in the

communicative situation of the Internet. Mass media cannot, therefore, function as a template for the democratisation of the Internet – they were just better at camouflaging the capitalist crisis of democracy later exacerbated by digital capitalism.

What, then, are other, less contentious, alternatives for the Internet's restructuring? The findings of this paper point less towards an answer than to the ineffectiveness of the question itself. Does not our conclusion that digital capitalism is born from the same logic of accumulation that has brought to the fore the contradiction of democracy and capital mean that its restructuring must coincide with a restructuring of democracy itself? Throughout this paper, we have criticised the use of the liberal public sphere and mass media as ideals of democracy – why not regard representative democracy too as an unattainable ideal? The more radical continuation of this argument would be to look for organisational forms beyond 'democracy' as we know it to act as a gauge for a socially beneficial Internet, found e.g., in the theories of 'polycentric governance' (Ostrom 2010) – a path not taken but certainly akin to our analysis.

There is no simple 'going back' to a form of democracy whose gap between ideal and reality has outgrown our lived experience of democratic politics under digital capitalism. The commercial Internet has changed what democracy looks like, but maybe it has also changed what democracy ought to be. A solution for the Internet must also be a solution for democracy. Instead of asking how to restructure the Internet to strengthen democracy, it may be more effective to ask how to restructure democracy *in relation to* the Internet. Could the capitalist castration of democracy be counteracted by the conception of new governmental institutions modelled after the Internet's participatory power (Gardels and Berggruen 2019, 35)? Could the toxicity of current Internet communication be defused by abstracting from its commodification of individuality a new invigoration of direct or plebiscitary democracy, a new 'design,' in Feenberg's sense, beyond representative democracy?

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