COMMENT

Light and Shadow of the Digital Factory: Response to the Comments

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Abstract
This response to the comments on *The Digital Factory* discusses why and how the concepts of the digital factory and digital Taylorism have been applied in the book, as well as the question of the relationship between digital control and workers' resistance to algorithmic management technologies. While agreeing with the comments that point to the limitations of the concepts used, this response argues that these can be productive precisely by drawing our attention to aspects that are otherwise difficult to bring to light. In terms of the potential for workers' resistance, many collective and individual forms of such resistance remain possible in labour regimes under algorithmic management, as well as in other coexisting labour regimes.

Let me begin by warmly thanking all the reviewers and the editors for their engagement with my work. Reading their careful, poignant, and gracious reviews and seeing the book through their eyes has been a pleasure. The spirit of this response is accordingly not to defend the book against their critiques but rather to pick a few crucial points and continue the discussion. Firstly, I want to situate and discuss the concept of the digital factory and the way mobilizing the factory and Taylorism works for the book. A second aspect I want to raise concerns the question of digital control and the ways workers resist technologies of algorithmic management.

To start, it might make sense to look back at the beginning of this book project to remember in what social, political, and intellectual conditions my thinking about "the digital factory" started. Over ten years ago, when I began my research for the project, the debates around labour and digital technology were somewhat different. In 2013, the famous report "The Future of Employment" by the Oxford scholars Carl Benedikt Frey and Michael Osborne caused significant media attention.[1] With a view to developing digital technologies, the report estimated that forty-seven per cent of US jobs were at risk of being lost to robots and computers. In this

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[1] Carl Benedikt Frey and Michael Osborne, "The Future of Employment", Oxford Martin School Working Paper (Oxford, 2013).

prognosis, it was especially low-paid, low-qualified, and manual jobs that were susceptible to computerization.

Today, over ten years later, we can see that especially these jobs have proved to be more resistant to automation than predicted, and the numbers suggested by Frey and Osborne are far from the current situation. In some countries of the global North, like here in Germany, employers in some of the sectors where the risk of technological unemployment was predicted to be very high are facing substantial labour shortages, with no robots in sight to take over the work. In hindsight, 2013 constituted an example of what Aaron Benanav describes as an "automation discourse", an uptick in predictions about the imminent end of work and its social consequences.[2]

According to Benanav, such automation discourses can be found with almost cyclical regularity in the history of capitalism. The relation of these conjunctures of automation discourses to economic processes is complex. While they are always accompanied by automation processes, job losses, and restructuring, the loss of jobs was never nearly as significant as predicted. Benanav argues that the underlying cause of this recurrent discourse is indeed "a deep anxiety about the functioning of the labor market",[3] but he ascribes underemployment and unemployment not to ground-breaking developments in robotics or computation but rather to stagnating economic development.

Since the release of OpenAI's ChatGPT software in 2022, we can observe yet another instantiation of this discourse, and similar predictions of technological unemployment have become popular again. However, while the newspaper headlines are sometimes worded in a way similar to those of 2013, this time it is not low-paid and predominantly manual labour but rather better-paid intellectual and creative work that is seen to be at risk. It is interesting to see how much things have changed in ten years. Today, it seems almost more likely that the jobs of a lawyer or a Hollywood screen writer will be automated than that of a delivery worker. This is an inversion of Frey and Osborne and invites new empirical research. While I suspect that some findings would be quite similar (and automation still means mostly the social and spatial recomposition of work and its devaluation, intensification, and precarization rather than its end), there is much work to be done and the dynamics of these transformation processes is a major challenge to critical research.

In any case, the prediction that digital technology would push the automation of predominantly low-paid, manual, boring, and repetitive work was part of the discourse that I wanted to empirically test and contest with this book when I started out in 2012. These headlines and public discourses corresponded with many social and political theories of the time. In Italian post-autonomist Marxism, to take a strand of thought that has always been very influential and important to me, the figures of "immaterial labour" and "cognitive capitalism" painted a decidedly post-industrial picture of the transformations in the world of work driven by digital technologies. I cannot do justice here to these complex and important debates and how they have evolved since. It seems important, however, to go back to these

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[2]Aaron Benanav, *Automation and the Future of Work* (London and New York, 2020).
[3]*Ibid.*, p. 25.

years, because these debates served as a starting point for my research and motivated me to mobilize the factory as a conceptual – and intentionally counter-intuitive – engine to think through the transformation of labour.

Thinking digital capitalism through the factory and Taylorism is then an intervention that underlines forms of continuity, non-simultaneity, and complex histories. Mobilizing the factory in this way clearly also raises problems. I can agree here with the points made in the reviews. In many talks and discussions on the book, the first question from the audience is often aimed exactly at the question of the factory and the ways this metaphor fails to account for all the differences between, say, Ford in the early twentieth century and a contemporary workplace. In this situation, and even more so vis-à-vis the points raised by the reviews from a historical perspective, I have to agree. Of course, the transformations are huge and the differences between traditional Taylorism and today's digital Taylorism, or however you want to name it, are enormous. Thinking the present through the past always runs the risk of either overstating continuities or overstating ruptures. It seems to me that such abstractions are, in a way, always incomplete and have their dark spots. But because of this, I think that such perspectives and abstractions can be productive. Each model will spotlight certain things while others stay in the shadow. And this is exactly what happens when thinking the present through the historical figure of the factory. In that sense, I can agree with Greg Downey's point that the metaphor of the digital factory is the main limitation of the book. However, I hope and think that this limitation has also been very productive.

The point, made in some of the reviews, regarding more complex histories of the factory and its labour regime is also well taken. What I describe as the quintessential labour regime of the factory clearly has more diverse origins, spatialities, or histories, such as the plantation as shown by Görkem Akgöz or Nico Pizzolato. Similarly, we could, with a view to the rationalizing of office labour, also talk about the "digital office", as Downey argues convincingly.

Another crucial point raised by several of the reviews is the question of worker's resistance. While the book is interested in, and engaged with, labour conflicts, I think today that it sometimes overstates the control aspect of digital technologies, and algorithmic management in particular. In the following, I want to reflect on this point in the context of more recent research I have done.

Researching platform labour with my colleagues in Berlin after the completion of the book, we spent a lot of time analysing and discussing the question of algorithmic management and the levels of control these systems allow. The term "algorithmic management" describes how digital technologies are increasingly used to plan, organize, measure, and control labour and the labour process. Especially during the COVID-19 pandemic, such technologies have seen a surge, arguably also substituting for stagnating attempts to automate labour.[4] Clearly, platforms like Uber or Deliveroo have new digital means of controlling their workers. Systems of algorithmic management combined with GPS tracking open new possibilities of control that are used by platforms.

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[4] S. Schaupp, "COVID-19, Economic Crises and Digitalisation: How Algorithmic Management Became an Alternative to Automation", *New Technology, Work and Employment*, 38:2 (2022), pp. 311–329.

At the same time, the level and impact of control are often overestimated. Algorithmic management always has gaps that are strategically sought out by workers and used creatively. We spoke to food delivery riders using ways of strategically disconnecting their phones to avoid unpopular orders or sanctions, Uber drivers experimenting collectively with the platform's algorithms to hack the bonus programmes and understand how to manipulate the algorithm in their interest, or platform cleaning workers trying to circumvent platform fees by cooperating with customers, to give only a few examples.[5] Platform labour in general is not only a site of visible and intense strikes and conflicts that have been waged in Europe and globally by platform workers; it is also characterized by an everyday and almost generalized conflict over the appropriation of surplus value in which both platforms and workers try to use the algorithms to their advantage. As with any other form of labour control and organization, workers facing algorithmic management are far from powerless, but develop many collective and individual forms of resistance.

In a way, we could argue that it is not only (or not even primarily) the level or efficiency of direct control (which can be patchy or low in other cases) but maybe even more the speed and cost-efficiency in the flexible inclusion of diverse workers into production processes that make algorithmic management a factor in the transformation of work. Looking at the role of migrant labour in digital platforms, I have argued, along the lines of an argument already developed in the book, that a crucial effect of algorithmic management is the way it enables the efficient and flexible inclusion of a heterogeneous group of (mostly migrant) workers into the platform's labour processes, high interchangeability, and constant workforce fluctuation.[6]

This also relates to the question of managerial labour raised by Akgöz. Algorithmic management does in many cases result in the automation of middle management (while the bigger strata of work to be managed seems to stubbornly resist attempts at automation). In most cases, however, these systems of algorithmic management work alongside human managers. Their work, evidently, is also changed by these technologies. The effects of this are clearly a gap in the book and invite further empirical work. Additionally, as Bridget Kenny graphically and convincingly argues, these digital technologies are always used in concrete places with their histories and presents of labour regimes and struggles. Across these settings, digital technologies play out very differently and play different roles in labour conflicts. Her concept of "conjunctural labour regimes" seems very promising to me.

Which brings me to a final point. With the concept of the digital factory, I wanted to shed light on sites of labour where digital technologies do not mean the end of labour nor its becoming immaterial. Speaking about digital Taylorism, however, I do not think that this is the new hegemonic form of labour in the present. Rather,

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[5]M. Altenried and V. Niebler, "Latent Conflict, Invisible Organisation: Everyday Struggles in Platform Labour", in S. Mezzadra *et al.* (eds), *Capitalism in the Platform Age: Emerging Assemblages of Labour and Welfare in Urban Spaces* (Cham, 2024), pp. 353–371, available at https://library.oapen.org/handle/20.500.12657/88352, last accessed 17 April 2024.

[6]M. Altenried, "Mobile Workers, Contingent Labour: Migration, the Gig Economy and the Multiplication of Labour", *Environment and Planning A: Economy and Space,* 0:0 (2021), available at https://doi.org/10.1177/0308518X211054846, pp. 1–16.

as I wrote in the introduction to the book, I think that it coexists – and must coexist – with other labour regimes that show very different characteristics. If one must summarize the defining characteristic of the contemporary world of work in one word, it could be "heterogenous". While I would leave the question of how that compares to other periods in time to labour historians, the way very different forms and regimes of labour (in all its aspects) coexist in one place and also across different geographies to form the totality of digital capitalism could constitute a fascinating entry point for further investigation.