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Editorial

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Digitalization and Labor Restructuring

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Abstract: This editorial shows how the digital economy continuously reshapes work and employment. Based on a literature review, it illustrates that digitalization frequently implies job loss, de-skilling and measures to restrict co-determination and participation of labor. However, digitalization also offers opportunities for managers, employees and unions to create new work tasks and conditions for skilled work. After showing major trends of digitalization in the last decades, the editorial illustrates recent research fields in economic geography.

Keywords: labor, work, digitalization, technology, trade union, online retail

The digital economy continues to reshape the dynamics of work and employment with the current wave of restructuring driven by fierce international competition and the imperatives of firm survival. While digitalization threatens existing jobs, skills and the agency of labor, it is also creating opportunities for firms and new forms of work (Gentili et al. 2020; ILO 2021; OECD 2019).

Digitalization is a fuzzy term and requires specification. There is a tendency in current literature to distinguish between digitization and digitalization (Frenzel et al. 2021). Digitization usually refers to the technical process of transforming data into digital formats, especially programming, data processing and storage. The invention of these processes has antecedents in the late 19th century, developed in the first half of the 20th century and continues into the present (Frenzel et al. 2021). However, the expansion into business and society started later, in the late 1970s and 1980s; and this socio-technical implementation is what the term digitalization refers to (Frenzel et al. 2021). Given the focus of this Special Issue, the latter term is used here.

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Digitalization in the latter half of the 20th century was characterized by a shift from using analogue electronic applications and mechanical technologies to the use of transistors and integrated circuit chips, which were built into various devices of so-called Information and Communication Technologies (ICT), such as mainframes, personal computers and cellular phones (Malecki & Moriset 2008). This was a technological revolution with both tremendous opportunities and as well as risks. At that time, the (potential) negative impacts of ICT on labor were discussed by referring to older critical thought traditions, such as assumptions about general loss of employment, widespread degradation of labor and deskilling, accompanied by social polarization into segmented labor markets with few winners and many losers (Leborgne & Lipietz 1988; Kern & Schumann 1987). Related issues that attracted critical concern were the impacts of ICT on the spatial division of labor between mostly skilled labor in the economic core regions and marginalized areas where jobs with low skill requirements prevailed. The implications of this division of labor for spatial inequalities was highlighted both within countries (Massey 1984) and internationally (Kaplinsky 1985). At the same time, digitalization promised increasing efficiency and flexibility in manufacturing and office administration, associated with new employment opportunities and more humane working conditions. Within economic geography, locally based high-tech clusters attracted attention as new places of knowledge creation and highly skilled work (Malecki & Moriset 2008). Digitalization was a challenge to labor representatives, who feared a widespread loss of jobs and deskilling of work tasks. Therefore, they explored the scope for labor agency in the context of digitally-supported work. For example, in some countries works councils and trade unions participated in projects to improve working conditions with regard to ergonomics, teamwork and training (Hirsch-Kreinsen 2016; Kern & Schumann 1987, see Fuchs 2020).

In the first quarter of the twenty first century, new opportunities and risks of digitalization on blue- and white-collar labor emerged around the world. The relevant technologies include the broad transmission capacities of the internet, storage and processing capacities (Big Data), artificial intelligence (AI), cyber-physical systems combining data and physical production, smart user interfaces and new hardware devices (Fuchs 2020). Robot technology has also advanced considerably in the last decades. Especially

when connected with monitors and sense gloves, robots enable digital remote diagnostics and are capable of performing tasks that pose high risks to human health. Another frequently applied device is 3D printing; machines that build products by using digital models; the 'additive' procedures save resources, which otherwise are spent in 'subtractive' processes, such as digital milling. 3D printing offers employment opportunities especially for small companies not only in large metropolises but also in medium-sized cities (Busch et al. 2021).

Beyond manufacturing, services are also increasingly pervaded by digital technologies. During the Covid-19 pandemic, digitalization revolutionized work that had formerly been largely conducted in office buildings. Since then, working from home increased considerably, particularly based on video conferences. After the pandemic, these changes allowed new scope for action, both for labor and employers, especially with regard to the decision about commuting to the office, working at home or somewhere else. At the same time, new challenges have emerged, for instance how to improve the organization of team work and socially integrate remote workers, how to apply existing labor regulation about ergonomics, employees' participation and co-determination, and how to avoid reinforcing and even accentuating the old gender-related division of labor (Leyshon 2023).

Not only is digitalization increasingly pervasive within firms of various sectors, both on the factory floor and in administrative work, but it is also dissolving existing work boundaries through the 'gig economy' encompassing a multitude of short-term and platform-based jobs (Keller 2022). A platform-based job means that the worker's contract with the employer is mediated through an online platform rather than a personal relationship. Individuals in various segments of the labor market increasingly experience insecure employment relations and an 'atomization' of workplaces (Graham 2020). Such management strategies are circumventing established labor agreements with research noting the detrimental consequences for delivery workers in urban areas (Graham 2020) and frequently has been described for delivery workers in urban areas (van Doorn et al. 2022). In this Special Issue, *Veronique Helwing, Philip Verfürth and Martin Franz* focus on the logistics sector and show that platform firms have negative impacts on labor standards in existing logistic firms, where jobs and working conditions were hitherto protected by established labor relations. As intermediaries, these platforms define the inclusion and exclusion of actors involved in the production networks of logistics. By offering cheaper conditions than the established firms, they can induce a race to the bottom in terms of labor conditions (Helwing et al. 2023).

The current wave of digitalization creates new challenges. In addition to the polarization between skilled and un-skilled labor that was a major concern in earlier debates (Kern & Schumann 1987), today studies additionally point to increasing pressure on skilled labor, due to the use of AI and machine-supported decision-making (Loebbecke & Picot 2015). Digitalization has the potential to devalue the work of professionals, experts and specialists, by reducing skill requirements and the associated incomes (Berger & Frey 2016; Frey & Osborne 2013; Strauss 2018). At the same time, it is once again those at the bottom of the social pyramid who seem to be hardest hit by recent processes of work restructuring, repeating the experience of Taylorism, where repetitive, deskilled work and low payment characterised the work of those already disadvantaged in the labor market. Negative impacts seem most prominent along existing axes of social inequality such as gender relations, age, ethnicity and migrant status as well as class (Graham et al. 2017; López 2023; van Doorn et al. 2022; Woodcock & Graham 2020), especially if this goes along with inadequate skills, or lacks of required formal qualifications (Fuchs et al. 2023).

The new push for digitalization also has shifted the public interest on its spatial impacts and its consequences countering the narrative that digitalization could create a 'flat' world with internet access, and thus access to communication and cooperation, available to all regardless of place. For example, based on a comprehensive literature review, Haefner & Sternberg (2020) question the assumption that rural areas easily benefit from digitalization by the generation of new job opportunities. Instead, research suggests new economic and social disparities. Digitally-based labor tends to expand in city regions that are already well-equipped with technologies and related infrastructure, which rural areas lack. Another issue are the disparities that exist within cities. Here, digital labor is not confined only to skilled work in urban high-tech industries and 'hip' start-ups. The increasing number of delivery workers mentioned above represents new forms of precarious labor that is characterised frequently by short-termed employment contracts, low payment and weak worker representation (van Doorn et al. 2022; Keller 2022; Woodcock & Graham 2019). However, the relations between cities, their hinterland and remote rural areas have been largely neglected in literature on digitalization (Rodríguez-Pose 2018). In this Special Issue, *Martina Fuchs, Peter Dannenberg, Tatiana López, Cathrin Wiedemann and Tim Riedler* draw attention both to the differences but also the interconnections evident between metropolitan areas and their hinterlands through case studies of warehouse work in online retail. In doing so, they provide insights into the spatial variety

of labor control that cannot generally be characterized by 'digital Taylorism' but also comprises other kinds of labor control (Fuchs et al. 2023).

In addition, the current push for digitalization shows impacts on the restructuring of labor in global value chains. On the one hand, digitalization offers opportunities for those formerly excluded from global value chains, for example small firm owners through the use of mobile phones (Hartmann et al. 2021). On the other hand, digitalization and internationalization as intertwined management strategies often cause negative impacts on labor, such as creating digitally-controlled jobs in different parts of the value chain, where digital devices surveil each work task in a detailed manner, for example in the different parts of the fashion value chain (López et al. 2022; López 2023).

These recently emerging new worlds of work are contested (Briken et al. 2017; Graham 2019). Such conflicts, resistance and bargaining occur on different spatial levels (at the workplace, in a region or nation, and internationally). Regulatory frameworks are relevant. In some varieties of capitalism, co-determination offers a basis for labor agency at the work-place, regionally and nationally but co-determination only exists in a few countries (Krzywdzinski 2018). There are efforts to strengthen the bargaining power of workers internationally, for example by organizing cooperative forms of platform work (ILO 2021) and by establishing networks of cooperation between labor representatives of different countries (López et al. 2022; López 2023). Furthermore, there are initiatives for fair work and labels for socially acceptable work. These initiatives bring together unions, labor-related researchers and further practitioners who aim at improving employment conditions in the digitalized world of work (Graham 2020; Krzywdzinski et al. 2023).

However, there are clear limits to labor's agency in the recent stage of capitalism (Strange & Zucchella 2017). Large firms seem especially adept at maintaining existing patterns of labor exploitation (surveillance and repetitive work), as *Mostafa Henaway* illustrates in his contribution on 'digital Taylorism' in this Special Issue. Henaway (2023) shows that Amazon is not completely successful by using digital technologies to structure and control the labor process and surveil workers. Amazon's efforts to balance the harmful effects of 'digital Taylorism' requires social welfare benefits that Henaway labels as 'corporate Keynesianism'. At the same time, Big Tech corporations can increase their power resources by controlling international digital 'ecosystems' (Birch 2020). Graham (2020, 453) emphasizes that these firms "mediate spatial interactions, and thereby exert immense power over local economic geographies" because they are "apparently too big to control, too new to regulate, and too innovative to stifle" (Graham 2020, 456). The international spread and power of these firms sets limits to the participation by works councils and unions, because the internationally coordinated action of works councils and unions is difficult due to a lack of financial resources, different political objectives and their voters who have a strong interest in work at their particular location (Fuchs et al. 2022).

The contributions of this Special Issue illustrate that digitalization takes place in various work tasks and thus is a label for heterogeneous processes of technological change. Digitalization is changing continuously and generating new forms again and again, thereby creating various opportunities for restructuring labor, with regard to employment opportunities, tasks designs and skills. The contributions illustrate that high risks emerge, with regard to job-loss, digital surveillance, monotonic work conditions and low incomes (Fuchs et al. 2023; Helwing et al. 2023; Henaway 2023). These risks differ between firms and regions. The contributions show that labels, such as 'digital Taylorism', are useful to explore the fields; however, they often occur in particular modifications. As Henaway (2023) shows with the example of 'corporate Keynesianism' at Amazon, capital also has to adapt to labour, at least partially.

More than ever, these current ambivalences reflected in the challenges and potential of digitalization, require a societal – including an academic – discourse that offers original and convincing answers and brings in novel and substantial ideas to the social narrative (Haefner & Sternberg 2020). Such approaches to human labor in 21st century capitalism include governance, politico-constitutional structures and initiatives for a more humane, participatory and democratic world of work (Cumbers et al. 2020).

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