

A Plea to Reflect on the Entanglements of Gendered Work Patterns and Digital Technologies

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Just like the First Industrial Revolution, digitalisation is found to be profoundly shaking up the world of work and it has therefore been called 'the Fourth Industrial Revolution', 'Economy 4.0', or 'Industry 4.0'. The rapidly increased implementation of smart technologies, automation, robotics, cyber-physical systems, and digital labour (cloud- and crowd work) in many occupational areas, including the service sector and industry, has sparked a variety of fundamental transformations in the organisation of professions, work, working conditions, and the structure of the labour market. In addition, the widespread use of mobile phones, computers, and data clouds has been challenging the traditional boundaries between private and professional life. Technological innovations have always been discussed as catalysts for social innovation.

However, digitalisation is not a one-way-street. It has to be regarded in the context of its multiple facets and consequences. On the one hand, it creates new possibilities – for example, to reconcile work and private life or to create less hierarchical industrial relations; on the other, it fosters new possible ways for employers to control employees and gives rise to less secure jobs, of which women are historically more often disadvantaged then men. And since technology is a human creation, historically grown social inequalities between genders, ethnicities, and classes are partly implied or transferred into algorithm decision-making, big data sources, and many other areas, and this has large-scale consequences (Eubanks 2018, Lischka, Klingel 2018).

It is striking that the current debate on digitalisation in the world of work and its

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consequences is dominated by gender-blind perspectives, especially in economics, labour research, computer science, and technology research (Rosenblat, Stark 2016; Scholz 2017; Vallas, Kovalainen 2019). This makes all the more important the studies and theories that introduce a perspective that systematically integrates gender and feminist theory into science and technology studies and into economic and labour research. It is not enough to just include a gender perspective in this research area, and it is instead necessary to take into account feminist theory, since many studies on artificial intelligence (AI) claim to use 'gender' perspectives, but actually incorporate or even undermine professional knowledge from gender studies and feminist research. This is evident, for example, in the debates on the controversial 'Gay Faces Study', which examines the extent to which a person's sexual orientation can be determined solely from their face (see Wang, Kosinski 2017; Leuner 2018). Conversely, in Gender Studies and Feminist Technoscience, there is a long tradition of exploring the relationship between gender, work, and technology (Haraway 1991b; Wajcman 1994; Ernst, Horwath 2014), which unfortunately has not yet received attention in the ongoing debate about digital workplaces and the social construction of digital industrial relations, data sets, and algorithms.

With reference to technology, one of the pioneers of Science and Technology Studies (STS) is undoubtedly Donna Haraway (1991a), who, in the 1990s, started a discussion on the disruptive and transformative potential of the upcoming 'virtual world' or emerging 'cyberspace' for traditional gender orders and for the dualistic divisions between humans and animals, and things and creatures. Since then, gender researchers in STS have assumed (and hoped) that individuals would be able to reinvent themselves in the virtual world beyond conventional dualisms and gender identities, which might challenge gendered, stereotypical, and restrictive notions of human abilities and interests. This vision culminated in the image of the 'cyborg' (Haraway 1991a). Some researchers even believed that the new technologies opened new job opportunities, particularly for women, because they perceived that completely new professions were emerging that initially had no gender connotations (Wajcman 2004: 108-109). The figure of the cyborg also serves to deconstruct the humantechnology-relationship within industrial relations (Halford et al. 2015). Indeed, women have become more and more powerful and more interested in technology, and they are entering the halls of engineering and computational science. Women are, even if only slightly, more involved in the construction of technology, in the smart industries, and in data science (O'Neil 2017). However, the tech industry remains merely white, male, middle class, and able-bodied (Rommeveit et al. 2017; Reinhardt 2015), and research about the digital divide indicates that globally women have less access to the world wide web, that they face cyber-bullying and -mobbing, and that their technical skills are disregarded (OECD 2018).

If we now ask not only about the connection between gender and technology, but also about the connection between work and gender, we inevitably come across two further lines of research: feminist organisation research, and labour and industrial relations research.

First, feminist organisation research shows that organisations do not function as gender-neutrally and rationally as is often assumed. Instead, feminist research has shown that gender becomes relevant in organisations, not only as a reminiscence of traditional stereotypes in the minds of individuals or in the form of identities, but in the structures of the organisation itself. The concept of the 'ideal worker' (Acker 1990, 2006) is based on a full-time worker who has no care obligations in private life and is available around the clock, which has the effect of excluding women in particular from careers (Acker 1990; Williams 2001; Hochschild, Machung 2012). Gender inequalities are effective on a cultural and symbolic as well as on a structural and an individual level (Acker 2006; Halford, Leonard 2001). Women are still disadvantaged in the labour market: they are disproportionally affected by precarious employment and the lack of social standards in employment, they earn less, they have fewer opportunities for advancement or further training, and as they are viewed socially as mothers and employees they suffer from the double burden of employment and care-work. Feminist organisational researchers are concerned with the interrelation of gender hierarchies in organisations: they study the processes of gendering work activities, the emergence of gendered work patterns, and the unequal placement of men and women in different professions, occupations and positions (Kalev, Deutsch 2018). From this perspective, an important research question is whether digitalisation can encourage organisations to change their work structures in order to facilitate the reconciliation of work and family life. Another research question is if and how organisations take women into account when building up an information technology infrastructure, in staff development, and in management/leadership.

Second, one stream of feminist labour research combines Marxist with feminist perspectives. It focuses on the relationship between work and gender and states that, in industrial societies, the divide between paid and unpaid work is interrelated with femininity and masculinity. One important feminist demand, among others, is that of equal pay for work of equal value. For this endeavour, feminist Marxist researchers investigate the necessary conditions for this in society and how to achieve them (McDowell 2014). Feminist labour research is interested in the integration of gender into supposedly gender-neutral production processes and, doing this, it sheds light on topics that were previously left invisible, such as a broad understanding of work, the issue of work-life balance and work-life-conflicts, and the important role played by unpaid-labour in society (Becker-Schmidt 2002; Federicci 2012). Feminist labour

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researchers have highlighted the key roles that white women and women of colour have played in the history of computing (Nakamura 2014; Hicks 2017) and in pioneering forms of creative online work (Pham 2015; Duffy, Schwartz 2018). Most importantly, feminist labour scholars draw attention to the non-paid labour of undervalued private and 'emotional' work (Hochschild 2003) that is based on immaterial skills, such as caring, loving, educating, communicating, entertaining, and coordinating, which are essential for most services jobs. It is interesting to note that it is precisely these skills, de-qualified and devalued as 'female', that are becoming particularly important in society today, in service work, and in the course of digitalisation. It is therefore hardly surprising that in recent years there have been calls for a revival of feminist Marxist approaches (Jarrett 2016; see also Wagesforfacebook.com).

All these perspectives from interdisciplinary feminist and gender research give important insights into the relationship of work, gender, and/or intersectional inequalities. We suggest that they need to be applied more strongly to the changes caused by digital technologies.

In this special issue, we intend to study gender in/equality in the era of 'Economy 4.0' by concentrating on the interconnection of work, digital technologies, and gender relations in the emerging digital age. We ask if the technologically-induced change in work will lead to a general change in gender order and gender relations: Will existing inequalities, such as vertical and horizontal gender segregation, the unequal distribution of income, the lack of opportunities for women's career development, the low level of recognition given to 'women's work', and the traditional division of labour in the family, be diminished? Or will they persist and even intensify? Our aim is to shed light on the multiple connections between the emerging Economy 4.0 and gender at the intersection of other categories of social inequality, such as race and class. By raising this question, we are approaching a growing field of research that, so far, has barely explored gender issues and the position of women in the labour market. On the contrary, current discussions on the digital transformation of work tend to focus on male-dominated industries (such as the automotive sector), or they conceive new occupational perspectives as disembodied and supposedly gender-neutral.

As we work and write on this special issue, global events are unfolding thick and fast due to the spread of the COVID-19 pandemic. Digital work is gaining momentum in the private sector as working from home is starting to be accepted in areas where it was uncommon or even unthinkable before. In the underfunded public sector, especially in primary and secondary education, it is becoming apparent that there is grossly insufficient digital infrastructure and a lack of concepts on studying, learning, and teaching online. Additionally, teachers have had to learn as they go along and apply digital education concepts without help from society or their organisation. In this situation, digitalisation has been 'fast-tracked' and the changes in the world

of work, as well as the gender arrangements interwoven with them, are accelerating in many countries.

At the same time, the pandemic has clearly highlighted gender inequalities at work (Schröder et al. 2020). It is already becoming apparent that women in particular are negatively affected by the pandemic (Kohlrausch, Zucco 2020; Kreyenfeld et al. 2020). The majority of women work in professions where they are at a high risk of getting infected and infecting their families (the health sector, care, services, retail and banking, education). Furthermore, as schools and kindergartens were or are closed in many countries, the pressure to work from home has hit women particularly hard. Often, fathers do not feel equally responsible for housework and child-rearing (Boll, Schüller 2020; Bünning, Hipp, Munnes 2020; Möhring et al. 2020). Even before the lockdown, the findings about men and women working from home showed an unequal division of gainful and non-gainful work: when both partners in a heterosexual couple worked from home in full-time employment, it was mainly the women who shouldered a greater amount of the care work. The 'gender-care share' is and has always been unequally distributed (Boll, Schüller 2020; Samtleben, Müller, Lott 2020). On the other hand, fathers and men more often work in jobs that are not considered as feasible to perform at home, just as it is part of the masculine symbolic order to be present at the workplace. Very few employers consider(ed) the fact that there is no such thing as an ideal worker and have hardly scaled down their performance requirements during the crisis.

Owing to long-term political ignorance about the unequal positioning of women in society, women in particular have been affected by the double burden of bringing up children, schooling them, and working at the same time. The pandemic has exposed these inequalities even more. Suddenly, politicians are praising 'women's professions' as highly important for society. For example, in Germany, these professions have been labelled 'systemrelevant', which means they are 'essential to the social system'. The denomination includes nurses and supermarket cashiers, whose contributions to society have been rather dismissed in recent decades. It is obvious to everyone in society that many 'women's professions' formerly deemed to be of little value actually ensure the maintenance and survival of society. About three-quarters of the jobs in critical infrastructure are held by women. Many of those jobs, however, cannot be automated, performed from home, or in some other way digitally transformed.

Will the powerful homology between masculinity and (digital) technology persist or will the exclusion and systematic devaluation of femininity in the context of technology become questionable? The new technological possibilities might change work, but, if gender inequalities are to be reduced, what matters is how professional frameworks are designed and used. To now it has been unclear what direction the new attention

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women's occupations have begun to receive will go in. Will it trigger a sustainable rethinking in politics? Will female-connoted professions finally be more up-valued because they are necessary for society?

The articles in this special issue present empirical evidence gathered prior to the COVID-19 pandemic and the recent wave of the digitalisation of work. Nevertheless, the authors identified fundamental patterns and dynamics that are also reflected in current developments and shape their course.

Bettina Kohlrausch and Lena Weber examine, from the perspective of feminist labour research, the question of whether digitalisation is helping to shift the boundary between devalued female activities and overvalued male activities, and whether gender segregation in the labour market and in organisations can be reduced by the new technological developments. They show that the digital transformation of work is based on gender inequalities that have grown historically and are not automatically resolved by digital technologies. On the contrary, their analysis shows that if complementary gender-equality policies are not implemented, the introduction of new technologies will exacerbate existing gender inequalities.

Katrin Golsch and Marco Seegers ask in their article to what extent men and women perceive technological changes in their workplace. Using data from the German panel-study SOEP, Golsch and Seegers' contribution fills a gap in the research, because in Germany, like in many other countries, a large part of the research on technological changes and their consequences is located in the field of industrial production. One shortcoming of this research is that many female-dominated occupations are per se excluded from consideration. One of the striking outcomes of Golsch and Seeger's research is that the kind of occupation – distinguishing between women's and men's occupations – has a profound impact on the perception of digitalisation. Gender segregation in the labour market is one reason why women are more likely to expect an increase in health risks and in work related demands than men.

Anja-Kristin Abendroth's contribution deals with the emergence of crowdwork as a new form of flexible work in which individuals solve problems or offer services or products for payment via online platforms. Abendroth investigates whether the gender pay gap also appears among crowdworkers and finds that female crowdworkers working on a marketplace platform earn a lower hourly wage than men. This gender pay gap can, at least in part, be explained by gender inequalities in the overall labour market. Her results also show that men get better pay especially when they have children, which can be explained by the fact that fathers are generally better positioned in the overall labour market and, thus, have easier access to better-paid work – not only because they have acquired the skills necessary to perform work on the platform, but also because overall labour market positioning is used as a quality signal on the platform or allows them to be picky about which crowdworking tasks to select.

Last but not least, in this special issue we take a look at the impact of COVID-19 on the development of digitalisation and work and gender. To gather first-hand international comments on this, we interviewed gender researchers and social and technical scientists from South Africa, Canada, the Czech Republic, Great Britain, Belgium, Finland, and Austria. We asked them about their personal impressions of the COVID-19 pandemic, their own work situation, and what changes they have seen in their area of research induced by the pandemic. We have bundled the exciting answers in the form of a collective interview in order to provide incentives for further thinking and research beyond national borders. At the end of this volume, we present some book and conference reviews in the field of gender, work, and digitalisation.

We wish you a stimulating reading experience and look forward to further exchanges in this important field of research.

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